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Form 68G

(April 2010)

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ENGLISH TEST

45 Minutes—75 Questions

DIRECTIONS: In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose "NO CHANGE." In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

PASSAGE I

Weimaraner Whimsy

While the story of Cinderella has been depicted countless times, few of its lead actresses are as fetching as the young heroine of *Fay's Fairy Tales.* A cascade of blonde curls covers her shoulders, thick lashes frame soulful dark eyes, and her moist nose glisten[1] appealingly at the end of a long snout.

Moist nose? Snout? Of course, for this Cinderella was photographed by William Wegman, an artist who has raised dog photography for the[2] level of art. His photographs of Weimaraners have gained him international acclaim[3] and made his pets, the best-known dogs,[4] since Lassie and Rin Tin Tin. [5]

Wegman came to the attention of the art world in 1970 with his portraits of his dog Man Ray, the first of Wegman's Weimaraners to pose for photos. The

1. **A.** NO CHANGE
   B. glistens
   C. glistened
   D. are glistening

2. **F.** NO CHANGE
   G. on
   H. to
   J. by

3. **A.** NO CHANGE
   B. international acclaim the world over
   C. worldwide international acclaim
   D. international acclaim around the world

4. **F.** NO CHANGE
   G. pets, the best-known dogs
   H. pets; the best-known dogs
   J. pets the best-known dogs

5. If the writer were to delete the questions "Moist nose? Snout?" from this paragraph, the essay would primarily lose:
   A. a serious and analytical tone.
   B. an emphasis on the surprising twist in the essay.
   C. an assertion of the essay's main purpose.
   D. nothing at all, since they create a meaningless digression.

photographer was fascinated by the neutral gray of the dog's coat and his willingness to pose while wearing different costumes. Wegman's photos of Man Ray grew in popularity. In 1982 the dog was named "Man of the Year" by the New York newspaper *The Village Voice.* [6]

Later, other Weimaraners became part of the Wegman family, giving him additional subjects for his photos. [7]

Each has a unique personality that Wegman considers carefully before deciding what sorts of pictures to take. [8]

[A] Chundo is eager to work, but he doesn't sit still very long. [B] Batty, who often falls asleep while posing, has a sweet and dreamy quality. [C] And Fay looked great in wigs, which makes her a natural choice to portray female characters. [D] While Wegman's reputation was made with art photography, in recent years his children's books have generated a new but equally devoted following. His whimsical style appeals to children, having chosen to [9] [10] reenact familiar fairy tales with canine characters. [11]

6. If the writer were to delete the phrase "named 'Man of the Year'" in the preceding sentence and replace it with "honored with an award," the paragraph would primarily lose:

F. an element of suspense leading to the next paragraph.
G. a specific detail that adds humor.
H. a fact that foreshadows later events.
J. a distinction between the two figures discussed in this paragraph.

7. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. Eventually,
B. After all,
C. Before long,
D. In time,

8. Given that all the choices are true, which one best conveys the idea that the individuality of the dogs inspires Wegman as a photographer?

F. NO CHANGE
G. Being his first Weimaraner, Man Ray was, of course, Wegman's favorite and was irreplaceable in many ways.
H. The dogs have each posed for so many different photographs that Wegman needs to give very little direction during a shoot.
J. As a breed, Weimaraners have such a distinctive look that most people have a hard time telling one Wegman dog from another.

9. **A.** NO CHANGE
B. looking
C. looks
D. was looking

10. **F.** NO CHANGE
G. being creative enough
H. sometimes deciding
J. particularly when he uses it

11. If the writer were to divide this paragraph into two, the most logical place to begin the new paragraph would be at Point:

A. A.
B. B.
C. C.
D. D.

With a keen eye for art, Wegman's Weimaraners lead
12

an ordinary dog's life in most ways. The breed is sociable
13

and intelligent, and Wegman reports that the dogs often compete to pose. In William Wegman's home, a dog's life is lived within the frame of a photograph.

12. F. NO CHANGE
    G. Despite their fame,
    H. Unlike most photography,
    J. Now considered a true artist,

13. A. NO CHANGE
    B. much
    C. more
    D. mostly

Question 14 asks about the preceding passage as a whole.

14. Suppose the writer's goal had been to write a brief essay describing the renewed popularity some classic children's stories are gaining with a new generation of readers. Would this essay accomplish that goal?
    F. Yes, because it details unique changes Wegman and his dogs have recently made to popular children's fairy tales.
    G. Yes, because it chronicles the rise and fall in popularity of such children's classics as *Cinderella.*
    H. No, because it focuses on Wegman's career as a photographer and his unique dogs, not on children's stories.
    J. No, because it examines a variety of projects that Wegman's dogs have been involved in since 1970.

PASSAGE II

Coming to America

Though it was fifteen years ago, I still remember my journey from China to the United States when I was seven years old. On the tarmac outside the crowded airport in Shanghai, I mustered the last of my feigned courage to wave goodbye to my grandparents and boarded the plane. The plane taxied a long way, then quickly sped up, gave a sudden jolt, and lifted off.

Seeing dark storm clouds ahead, drops of rain
15

began to streak my window. Feeling so much force against me, I shut my eyes in search of familiar memories I would recognize. I called up visions of Grandma singing
16

lullabies to me, of delicious meals at the Spring and

15. A. NO CHANGE
    B. Heading into dark storm clouds,
    C. As we headed into dark storm clouds,
    D. Frightened by dark storm clouds ahead,

16. F. NO CHANGE
    G. to recognize.
    H. to remember.
    J. DELETE the underlined portion and end the sentence with a period.

Autumn festivals, and of my schoolmates walking with me to school.

I was traveling from my home in Shanghai to New York City. I was to join my parents, who had gone to

pursue graduate degrees to the United States when I was just three. But I was quite nervous about living with these

people whom I could barely remember. Suddenly I felt empty, acutely aware that I was leaving the only home

I'd ever known.

As the plane gained altitude and the dark storm

clouds have given way to a deep blue sky. Images of home quickly filled that blue void. I saw myself blowing out

candles at my grandparents table on my seventh birthday.

We made do with dumplings, duck, and a small white cake.

17. Given that all the choices are true, which one provides material most relevant to what follows in this paragraph?

A. NO CHANGE
B. My school had been just a few blocks from my grandparents' house.
C. The Spring Festival, also known as Chinese New Year, was my favorite.
D. My best friend had lived next door with his parents and brothers and sisters.

18. The best placement for the underlined portion would be:

F. where it is now.
G. after the word *parents* (and before the comma).
H. after the word *gone*.
J. after the word *three* (and before the period).

19. Which choice most logically supports the first part of this sentence?

A. NO CHANGE
B. whom I missed so dearly.
C. who were living in the United States.
D. who were my parents.

20. **F.** NO CHANGE
G. knew.
H. knowing.
J. knowledge.

21. **A.** NO CHANGE
B. altitude; the
C. altitude. The
D. altitude, the

22. **F.** NO CHANGE
G. had gave
H. gave
J. give

23. **A.** NO CHANGE
B. grandparents'
C. grandparent's
D. grandparents's

24. Which choice most effectively expresses their great enjoyment of the food?

F. NO CHANGE
G. were fine with
H. forced down
J. feasted on

I can still picture the two beaming faces across the table—Grandpa with his knowing grin and Grandma with her plump cheeks dimpling as she smiled both [25] congratulating me on my good fortune of going to live in the United States. [26]

Twenty-four hours after leaving Shanghai, I finally got off the plane in New York. A woman recognized me [27] from pictures as my mother rushed toward me, wrapped me in her arms, and gently spun around with me. I immediately felt safe and at home in [28] her arms.

Now, as I reflect on that fateful trip, I am proud of the bravery of that little boy who left the security of his childhood home for a new life. [29]

25. **A.** NO CHANGE
B. smiled. Both
C. smiled—both
D. smiled; both

26. At this point, the writer is considering adding the following true statement:

In Chinese, the word *fu* means "good fortune."

Should the writer make this addition here?

F. Yes, because it clarifies what the narrator believes were the grandparents' true feelings.
G. Yes, because it supports the rest of the paragraph by explaining a Chinese birthday tradition.
H. No, because it would distract readers from the main focus of this paragraph.
J. No, because it creates confusion about what language the narrator will speak in the United States.

27. **A.** NO CHANGE
B. woman, recognizing me
C. woman, I recognized,
D. woman I recognized

28. Which of the following alternatives to the underlined portion would NOT be acceptable?

F. safely at home in
G. at home in the safety of
H. safely home in
J. home safety in

29. Which of the following sentences, if added here, would most effectively express one of the main ideas of the essay?

A. Since that day, my experiences have proved that anything worthwhile requires a little courage.
B. Knowing I had left China for good, I realized that I had taken my childhood home for granted.
C. My newfound freedom from my grandparents' overprotectiveness helped me become successful.
D. Truly, grandparents can affect a child's perspective on life and feelings of worth.

PASSAGE III

Pen Names

[1]

In May 1846, a newly published book of poems were [30] delivered to the home of three siblings, but no casual observer would have known that the recipients were also

30. **F.** NO CHANGE
G. were being
H. was
J. are

the authors. [31] The names appearing on the book's cover—Currer, Ellis, and Acton Bell, [32] weren't actually the authors' names. But this false attribution was no mistake; instead, Charlotte, Emily, and Anne Brontë had published their first work using pen names—names assumed by authors to conceal their identities.

[2]

The list of writers who have chosen to use a pen name is lengthy. It includes Stephen King, who published novels under the name Richard Bachman, and Samuel Clemens, who adopted the riverboat term Mark Twain. Do you know what the term *mark twain* means? [33] There are perhaps as many reasons for choosing to write under a pen name that [34] there are pen names themselves. An author may seek to protect his or her privacy, or authors already known for a certain type of work may wish to avoid readers' preconceptions when writing in a different genre. Dean Koontz, famous for his suspense thrillers, [35] uses a pen name when he wrote [36] mysteries.

31. At this point, the writer is thinking about adding the following true statement:

> It is possible that their closest friends knew the truth.

Should the writer make this addition here?

- **A.** Yes, because it supports one of the points made in the preceding sentence.
- **B.** Yes, because it provides an effective transition to the rest of this paragraph.
- **C.** No, because it raises questions about the moral character of these authors.
- **D.** No, because it is of little relevance to this paragraph and stalls its development.

32.
- **F.** NO CHANGE
- **G.** Bell—
- **H.** Bell;
- **J.** Bell

33. Which choice provides the most logical and effective transition to the rest of this paragraph?

- **A.** NO CHANGE
- **B.** Have you ever read anything written by these two authors?
- **C.** Why give up the thrill of seeing one's name in print?
- **D.** How does a writer go about selecting a pen name?

34.
- **F.** NO CHANGE
- **G.** as
- **H.** and
- **J.** DELETE the underlined portion.

35.
- **A.** NO CHANGE
- **B.** Koontz, famous for his suspense thrillers
- **C.** Koontz famous for his suspense thrillers,
- **D.** Koontz famous for his suspense thrillers

36.
- **F.** NO CHANGE
- **G.** he was writing
- **H.** writing
- **J.** written

[3]

Sometimes, if the need for a pen name is more personal. In order to hide the fact that he was in prison, William Porter used the pen name O. Henry while publishing several stories prior to his release. In the nineteenth century, a pen name often was used to disguise its gender.

Mary Ann Evans was a popular English novelist during the Victorian era. She was following the tradition of the Brontë sisters, who used pen names to avoid the prejudice then shown by critics, publishers, and readers toward female authors.

[4]

A pen name can come to overshadow a writers given name. Few readers would recognize the name Theodor Geisel, though many know his pen name: Dr. Seuss. [43] But time often erodes the disguise such

37. **A.** NO CHANGE
B. since
C. when
D. DELETE the underlined portion.

38. **F.** NO CHANGE
G. one's
H. their
J. it's

39. Given that all the choices are true, which one provides the best support for the statement in the preceding sentence?

A. NO CHANGE
B. Evans, who changed her first name to Marian, used a pseudonym when publishing her work.
C. Evans wrote the critically acclaimed nineteenth-century novel *Middlemarch.*
D. Evans published her novels using the masculine name George Eliot.

40. **F.** NO CHANGE
G. coming after
H. imitating
J. pursuing

41. **A.** NO CHANGE
B. a writer's
C. an authors
D. an authors'

42. Which of the following alternatives to the underlined portion would NOT be acceptable?

F. Geisel, despite the fact that
G. Geisel; nevertheless,
H. Geisel; however,
J. Geisel, so that

43. The writer is thinking about deleting the preceding sentence. Should this sentence be kept or deleted?

A. Kept, because it provides support for the statement in the sentence that precedes it.
B. Kept, because it shows that some authors identify themselves as doctors when they get published.
C. Deleted, because it refers to an author of children's books in an essay about adult novelists.
D. Deleted, because it distracts readers from the main focus of this paragraph.

names afford. Today many of us remember the classics
44
of the Brontës, while Currer, Ellis, and Acton Bell are mere literary footnotes.

44. **F.** NO CHANGE
G. remember, the classics,
H. remember, the classics
J. remember the classics,

Question 45 asks about the preceding passage as a whole.

45. While reviewing notes for this essay, the writer comes across some information and incorporates it into the following sentence:

> Likewise, when the scholar and literary critic Carolyn Heilbrun writes mysteries, she uses the pen name Amanda Cross.

If the writer were to include this sentence in the essay, the most logical place to add it would be after the last sentence in Paragraph:

A. 1.
B. 2.
C. 3.
D. 4.

PASSAGE IV

Blue Jeans: Everything Old Is New Again

In the late 1800s, clothing store owner, Levi Strauss
46
patented the practice of putting rivets, tiny metal studs, on the stress points of men's "waist overalls." Waist overalls, which eventually would be known as jeans, were made out of denim, a durable cotton cloth used especially for work
47
clothes. Strauss's denim pants with rivets were the first pants to be called jeans. Over time, various styles and designers' of jeans have garnered a share of public
48
devotion. Independent of brand names, though, jeans have historic significance regardless of brand name
49
and, for many of us, emotional significance.

46. **F.** NO CHANGE
G. owner Levi Strauss,
H. owner, Levi Strauss,
J. owner Levi Strauss

47. **A.** NO CHANGE
B. denim;
C. denim being
D. denim, this was

48. **F.** NO CHANGE
G. those with designs
H. designer's
J. designers

49. **A.** NO CHANGE
B. no matter what the brand
C. along with emotional value
D. DELETE the underlined portion.

[50] Through the 1920s, waist overalls or jeans we're primary considered work pants. However, in the 1930s, due to the increasingly admired image of the rugged, jeans-wearing Western cowboy, jeans became associated with the two main real values that are held by daring adventurers whose lives aren't average. In the 1950s, young film stars such as James Dean and Marlon Brando, T-shirted and jeans-wearing renegades who listened to rock music, wore their blue jeans in the spirit of rebellion. In the 1960s and 1970s, hippies personalized there jeans—which had taken on the relaxed look of the wide "bell" bottom—with embroidery, quilted patches, and beads. [54]

[1] Boot-cut, low-rise, extra-baggy carpenter-style jeans—an assortment of playful styles—gained popularity in the 1990s. [2] High-fashion clothing designers commonly featured jeans as a part of their clothing lines in the 1980s, and designer jeans quickly became part of mainstream fashion.

50. Given that all the following statements are true, which one, if added here, would most clearly and effectively introduce the main subject of this paragraph?

- **F.** The cultural message jeans convey has changed over the years.
- **G.** Many people believe the word *denim* is a derivative of *serge de Nîmes*, the name of a French fabric made of silk and wool.
- **H.** In 1864, one East Coast store advertised that it carried ten varieties of denim.
- **J.** Jacob Davis, a tailor from Reno, Nevada, worked closely with Strauss in manufacturing riveted waist overalls.

51.
- **A.** NO CHANGE
- **B.** primary were
- **C.** were primarily
- **D.** primarily we're

52.
- **F.** NO CHANGE
- **G.** these.
- **H.** adventure and individualism.
- **J.** notions or ideals of acting independently and dangerous undertakings involving risks.

53.
- **A.** NO CHANGE
- **B.** his or her own
- **C.** they're own
- **D.** their

54. The writer is considering deleting the phrase "with embroidery, quilted patches, and beads" from the preceding sentence (adjusting the punctuation as needed). Should this phrase be kept or deleted?

- **F.** Kept, because it provides examples that help readers understand how hippies personalized jeans.
- **G.** Kept, because it suggests that hippies sold decorated jeans at retail stores in the 1960s and 1970s.
- **H.** Deleted, because it detracts from the sentence's claim about the popularity of bell-bottom jeans in the 1960s and 1970s.
- **J.** Deleted, because it doesn't describe what the embroidery, patches, and beads looked like.

55. Which of the following alternatives to the underlined portion would NOT be acceptable?

- **A.** gave prominence to
- **B.** materialized
- **C.** showcased
- **D.** emphasized

[3] Styles continue to evolve, of course. [4] Every year it seems there's a new favorite look or fit. [56]

As jeans-lovers have entered the corporate world, they have popularized a casual work look, wearing jeans as the basic wardrobe to seem [57] laid-back but actually ambitious new professionalism. Jeans, at once gritty and earthy, urban and rural, fashionable and simple, [58] are casual but also convey an underlying assertiveness that no other staple of our wardrobes can match.

56. For the sake of the logic and coherence of this paragraph, Sentence 2 should be placed:

- **F.** where it is now.
- **G.** before Sentence 1.
- **H.** after Sentence 3.
- **J.** after Sentence 4.

57.
- **A.** NO CHANGE
- **B.** of a seemingly
- **C.** in seeming
- **D.** as they seem

58.
- **F.** NO CHANGE
- **G.** which are fashionable and they're simple,
- **H.** as something simple can be in fashion,
- **J.** having fashion being simple,

Question 59 asks about the preceding passage as a whole.

59. Suppose the writer's goal had been to write a brief essay focusing on how clothing designers have influenced modern clothing trends. Would this essay accomplish that goal?

- **A.** Yes, because it makes clear that high-fashion clothing designers influenced the popularity of jeans.
- **B.** Yes, because it suggests that modern clothing trends are a result of designers' interests and work.
- **C.** No, because it instead focuses on giving an overview of the history and cultural significance of jeans.
- **D.** No, because it instead focuses on how movie stars have influenced modern clothing trends.

PASSAGE V

Barbara McClintock and the Genetics of Maize

As a leader in the field of genetics, Barbara McClintock of human genes [60] made significant steps in unraveling the mysteries.

60. The best placement for the underlined portion would be:

- **F.** where it is now.
- **G.** after the word *steps*.
- **H.** after the word *unraveling*.
- **J.** after the word *mysteries* (and before the period).

When she began studies in the 1920s, scientists had only recently began to consider genetics a field of study and accept the research of Gregor Mendel (1822–1884). [62] His theory stated that plants resembled their "parents" in a predictable manner based on laws of inheritance. However, McClintock's research pushed the field of genetics beyond Mendel's principles.

McClintock believed maize (corn) was idealistically a plant to study because each ear had hundreds of kernels for each with a different set of chromosomes. The first to perfect a staining technique for distinguishing the individual chromosomes of maize. McClintock studied the way genes were arranged on these chromosomes. By 1951, she had studied many generations of maize, noting the locations of groups of genes as the plants reproduced.

61. **A.** NO CHANGE
B. had only recently begun
C. have only recently began
D. have only recently begun

62. The writer is considering deleting the parenthetical information (and the parentheses) from the preceding sentence. If the writer were to make this deletion, the paragraph would primarily lose:

F. information needed to understand why McClintock was motivated to continue researching Mendel's theories.
G. information that helps put Mendel's life and work into historical context.
H. the approximate amount of time that Mendel spent in school.
J. a time frame during which Mendel's discoveries were considered valid.

63. **A.** NO CHANGE
B. manner. Based
C. manner; based
D. manner that based

64. Given that all the choices are true, which one most effectively leads the reader from this paragraph into the remainder of the essay?

F. NO CHANGE
G. Mendel generated his theory while living in a monastery and conducting his experiments in the garden there.
H. Therefore, Mendel laid the groundwork for future studies about genetics.
J. McClintock was elected as a member to the prestigious National Academy of Sciences in 1944.

65. **A.** NO CHANGE
B. an ideal
C. an ideally
D. an idealistic

66. **F.** NO CHANGE
G. kernels;
H. kernels,
J. kernels having

67. **A.** NO CHANGE
B. maize
C. maize,
D. maize;

McClintock found that some of the maize kernels were striped or spotted rather, then the uniform color (68)

found in the parent plants. For example, these findings (69) were in marked contrast to Mendel's work, which had concluded that the kernel color of offspring could be predicted from the combination of genes inherited from the parent plants. In the multicolored kernels, McClintock discovered that specialized genes, later called transposons, were changing positions on and between the chromosomes. These changes caused a deviation from the kernel color of (70) the maize that would have been anticipated by scientists. (70) McClintock named this genetic phenomenon *transposition*.

McClintock's work was far ahead of the other genetic research of her time. It took the scientific community over thirty years to understand (71) and publicly recognize her discoveries. In other scientific fields, the concept of transposition may (72) had wide-ranging applications, and (73) in the development of medical treatments for bacterial infections and cancer. After the importance of her research gained appreciation for its value, (74) she was awarded the Nobel Prize in Physiology or Medicine (75) in 1983. (75)

68. **F.** NO CHANGE
G. spotted, rather then
H. spotted rather than
J. spotted rather, than

69. **A.** NO CHANGE
B. Next, these
C. Nonetheless, these
D. These

70. **F.** NO CHANGE
G. scientific anticipation of the expected kernel color.
H. color that people in science had thought would be in the kernels.
J. expected color of the kernels.

71. **A.** NO CHANGE
B. understand,
C. understand;
D. understand them

72. **F.** NO CHANGE
G. could of
H. have
J. has

73. **A.** NO CHANGE
B. that are seen
C. such as
D. DELETE the underlined portion.

74. **F.** NO CHANGE
G. won appreciation given that it was worthwhile,
H. was considered important enough to be appreciated,
J. gained appreciation,

75. Given that all the choices are true, which one most effectively concludes the sentence by giving a specific example of the acknowledgment McClintock finally received for her achievements?

A. NO CHANGE
B. could attribute her success to her early research experiences at Cornell University.
C. continued to work at the Cold Spring Harbor Laboratory in a position she'd held since 1941.
D. was thankful for all of the people who helped her reach her goals.

END OF TEST 1

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

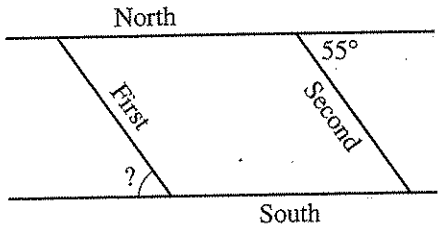
You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

DO YOUR FIGURING HERE.

1. On the map below, 2 parallel streets, North and South, intersect 2 other parallel streets, First and Second. The acute angle at which Second Street intersects North Street measures 55°. What is the measure of the acute angle at which First Street intersects South Street?



A. 35°
B. 55°
C. 62.5°
D. 65°
E. 70°

2. Which of the following is a simplified form of the expression $4(2 + 5x) + 9 - 2x$?

F. $3x + 17$
G. $7x + 15$
H. $18x + 17$
J. $26x + 9$
K. $35x$

3. A point at $(-2,8)$ in the standard (x,y) coordinate plane is shifted right 8 units and down 2 units. What are the new coordinates of the point?

A. $(-10,10)$
B. $(0, 0)$
C. $(6, 6)$
D. $(6,10)$
E. $(10,10)$

DO YOUR FIGURING HERE.

4. To attend an annual banquet, members pay \$17 per ticket while nonmembers pay \$20 per ticket. What is the total amount, in dollars, from the sale of 70 member tickets and n nonmember tickets?

   F. $n + 70$
   G. $(20 + 17)n$
   H. $20(n + 17)$
   J. $20(n + 70)$
   K. $20n + 17(70)$

5. A coat originally priced at \$80 is discounted to \$60. What is the percent of discount on this coat?

   A. 13%
   B. 20%
   C. 25%
   D. 30%
   E. $33\frac{1}{3}\%$

6. In $\triangle ABC$, $\angle A$ and $\angle C$ are congruent, and the measure of $\angle B$ is 114°. What is the measure of $\angle A$?

   F. 33°
   G. 57°
   H. 60°
   J. 66°
   K. 114°

7. Bella will pick 1 jelly bean at random out of a bag containing 28 jelly beans that are in the colors and quantities shown in the table below. Each of the jelly beans is 1 color only.

Color	Quantity
Green	6
Black	3
Red	5
Orange	2
Yellow	4
Blue	8

   What is the probability that Bella will pick a blue or yellow jelly bean?

   A. $\frac{1}{3}$
   B. $\frac{3}{4}$
   C. $\frac{1}{7}$
   D. $\frac{2}{7}$
   E. $\frac{3}{7}$

DO YOUR FIGURING HERE.

8. What is an automobile's average speed, in miles per hour, if it travels 60 miles in $1\frac{1}{2}$ hours?

F. 30
G. 40
H. 60
J. 90
K. 120

9. To determine a student's overall test score for the semester, Ms. Ackerman deletes the lowest test score and calculates the average of the remaining test scores. Niels took all 5 tests and earned the following test scores in Ms. Ackerman's class this semester: 62, 78, 83, 86, and 93. What overall test score did Niels earn in Ms. Ackerman's class this semester?

A. 77.5
B. 80.4
C. 83.0
D. 85.0
E. 85.5

10. For the equation $5y + n = m$, which of the following expressions gives y in terms of m and n ?

F. $\frac{m-n}{5}$

G. $\frac{m-5}{n}$

H. $\frac{m+n}{5}$

J. $\frac{n-m}{5}$

K. $m - n - 5$

11. If $5 + 2x = 19$, then $3x =$?

A. 7
B. 12
C. 15
D. 21
E. 36

12. The perimeter of a square is 24 feet. What is the area of the square, in square feet?

F. 6
G. 12
H. 36
J. 72
K. 576

13. What is 7% of 4.58×10^6 ?

A. 32,060,000
B. 3,206,000
C. 320,600
D. 763.33
E. 76.33

DO YOUR FIGURING HERE.

14. Which of the following expressions is a factor of the expression $x^2 - 6x + 8$?

F. $x - 3$
G. $x - 4$
H. $x - 5$
J. $x - 6$
K. $x - 8$

15. Given real numbers a, b, c, d, and e such that $c < d$, $e < c$, $e > b$, and $b > a$, which of these numbers is the greatest?

A. a
B. b
C. c
D. d
E. e

16. A new operation, ♦, is defined on pairs of ordered pairs of integers as follows: $(a,b) \diamond (c,d) = \frac{ac + bd}{ab - cd}$. What is the value of $(2,1) \diamond (4,6)$?

F. $-\frac{7}{11}$
G. $-\frac{7}{4}$
H. $\frac{7}{4}$
J. 7
K. 14

17. A high school band needs to make 3 sizes of flags—small, medium, and large—for an upcoming halftime show. The 3 sizes of flags are made by combining 1-foot squares of material that come in 2 colors. Four band members have agreed to make the flags. The information they will need is given to them in the tables below. The table with colors tells how many 1-foot squares of each color are needed for each size flag, and the table with names tells how many flags of each size that each person is to make.

	red	blue
small	2	2
medium	5	3
large	10	5

	small	medium	large
Jalinda	0	6	2
Lance	0	3	3
Hamako	2	6	0
Dakota	8	0	0

How many 1-foot squares of blue material does Lance need to make his flags?

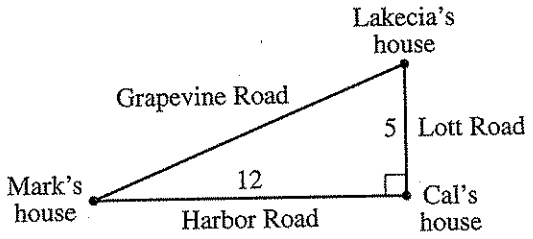
A. 42
B. 24
C. 20
D. 15
E. 14

DO YOUR FIGURING HERE.

18. What is the least common multiple of 80, 70, and 30 ?

F. 60
G. 168
H. 180
J. 1,680
K. 168,000

19. The figure below shows Mark's, Cal's, and Lakecia's houses at the 3 vertices of the right triangle formed by 3 roads. The distances given in the figure are in miles. Mark and Lakecia each make a trip from Mark's house to Lakecia's house. Mark takes Grapevine Road. Lakecia takes Harbor Road to pick up Cal, and then takes Lott Road. How many miles shorter is Mark's trip than Lakecia's trip?



A. 1
B. 4
C. 5
D. 7
E. 8

20. Which of the following is equivalent to $(a^8)^{24}$?

F. $192a$
G. $32a$
H. $8a^{24}$
J. a^{32}
K. a^{192}

21. For the function $h(x) = 4x^2 - 3x$, what is the value of $h(-3)$?

A. −99
B. −15
C. 27
D. 45
E. 153

22. The Carousel Clothes Shop is advertising a sale featuring 30% off the marked price on any item. Which of the following gives the sale price, in dollars, of an item with a marked price of p dollars?

F. $0.3p$
G. $p - 30p$
H. $p - 0.3$
J. $p + 0.3p$
K. $p - 0.3p$

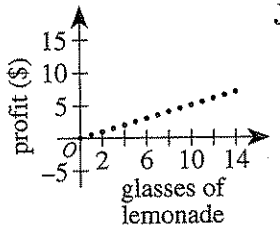
DO YOUR FIGURING HERE.

23. A store advertises packs of chewing gum at 5 for \$1.29. At this advertised price, how much would the store charge for 2 packs of gum?

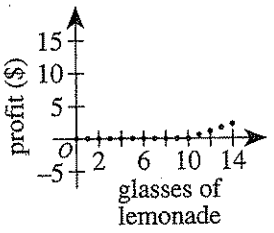
A. \$0.65
B. \$0.52
C. \$0.50
D. \$0.26
E. \$0.25

24. Johnny is selling lemonade. He paid \$5.00 for his supplies and charges \$0.50 per glass of lemonade. Johnny's profit is found by subtracting his expenses from his income. Which of the following graphs represents his profit as a function of the number of glasses of lemonade he sells?

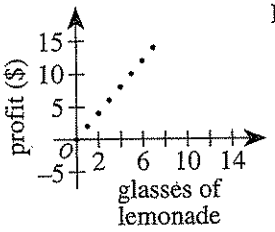
F.



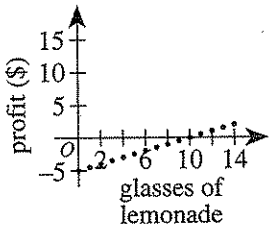
J.



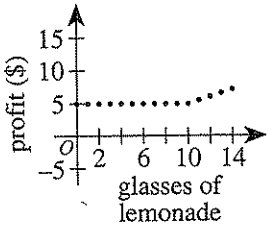
G.



K.



H.



25. The positive integer $n!$ is defined as the product of all the positive integers less than or equal to n. For example, $3! = 1(2)(3) = 6$. What is the value of the expression $\frac{6!}{3!2!}$?

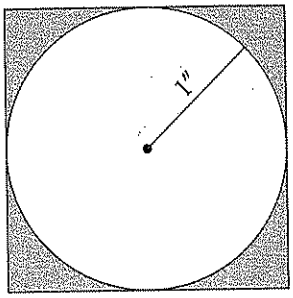
A. 1
B. 3
C. 6
D. 60
E. 120

DO YOUR FIGURING HERE.

26. Ms. Johnson purchased 1,000 prizes for the school carnival for \$90. Each prize costs either \$0.05 or \$0.25. How many of the less expensive prizes did she buy?

F. 200
G. 360
H. 500
J. 640
K. 800

27. A circle with a radius of 1 inch is inscribed in a square as shown below.



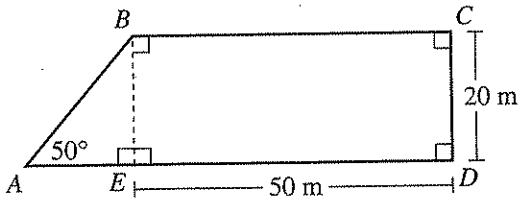
What is the area of the shaded region, in square inches?

A. π
B. $8 - \pi$
C. $4 - \pi$
D. $2 - \pi$
E. $1 - \pi$

28. The lengths of the corresponding sides of 2 similar right triangles are in the ratio of 4:7. The hypotenuse of the smaller triangle is 20 inches long. How many inches long is the hypotenuse of the larger triangle?

F. 11
G. 23
H. 28
J. 31
K. 35

29. For the polygon below, which of the following represents the length, in meters, of $\overline{AE}$?



A. 20

B. 30

C. $\frac{20}{\tan 50°}$

D. $\frac{30}{\tan 50°}$

E. $\tan 50°$

DO YOUR FIGURING HERE.

30. The perimeter of a parallelogram is 76 inches, and 1 side measures 14 inches. If it can be determined, what are the lengths, in inches, of the other 3 sides?

F. 14, 14, 34
G. 14, 17, 17
H. 14, 24, 24
J. 14, 31, 31
K. Cannot be determined from the given information

31. Which of the following is a solution statement for the inequality $3x - 7 < 5 + 9x$?

A. $-2 < x$
B. $-\frac{1}{3} < x$
C. $-2 > x$
D. $1 > x$
E. $2 > x$

32. The pep squad plans to make a circular sign in the shape of a basketball to hang on a wall for the game. The circle will have a radius of 4 feet. Which of the following is closest to the perimeter, in feet, of the circle?

F. 8
G. 13
H. 25
J. 50
K. 200

33. $-5|-8+9| = ?$

A. −85
B. −5
C. −4
D. 5
E. 85

34. In a large high school, some teachers teach only 1 subject, and some teachers teach more than 1 subject. Using the information given in the table below about the math, science, and gym teachers in the school, how many teachers teach math only?

Number of teachers	Subject(s) taught
12	at least 1 class of math
10	at least 1 class of gym
20	at least 1 class of science
6	both gym and science but not math
5	both math and science but not gym
2	gym only
1	math, gym, and science

F. 1
G. 2
H. 5
J. 16
K. 28

DO YOUR FIGURING HERE.

Use the following information to answer questions 35–37.

The Environmental Club at Forrest Hills High School grows plants in the school's greenhouse. The members of the club sell the plants to raise money for the school, and Sami and Jacque are taking an inventory of the plants. The table below gives the numbers of packs of plants. For example, there are 60 packs of sunflowers with 1 plant per pack, 25 packs of petunias with 4 plants per pack, and 15 packs of tomatoes with 6 plants per pack. All of the packs have been counted except for the 6-plant packs of marigolds.

Plants	Number of 1-plant packs	Number of 4-plant packs	Number of 6-plant packs
Tomatoes	30	0	15
Marigolds	60	40	?
Petunias	0	25	100
Sunflowers	60	0	0

35. Jacque completes the inventory and later tells Sami that the number of marigold plants is the same as the number of petunia plants. How many 6-plant packs of marigolds are in the greenhouse?

A. 20
B. 25
C. 70
D. 80
E. 480

36. Mr. Mai bought $\frac{1}{10}$ of the sunflower plants for \$15.00. What was the price of 1 sunflower plant?

F. \$0.25
G. \$0.40
H. \$1.50
J. \$2.00
K. \$2.50

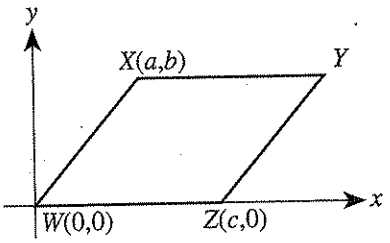
37. Helen takes all of the tomato plants in 1-plant packs and puts them together to make as many 4-plant packs as she can. How many whole 4-plant packs of tomato plants can Helen make?

A. 5
B. 7
C. 8
D. 15
E. 30

DO YOUR FIGURING HERE.

Use the following information to answer questions 38–40.

Parallelogram $WXYZ$ is shown in the standard (x,y) coordinate plane below. The coordinates for 3 of its vertices are $W(0,0)$, $X(a,b)$, and $Z(c,0)$.



38. What are the coordinates of Y?

F. (a,c)
G. (b,c)
H. (c,b)
J. $(a+b, c)$
K. $(a+c, b)$

39. The measure of $\angle Y$ is 50°. What is the measure of the angle between $\overline{WX}$ and the y-axis?

A. 35°
B. 40°
C. 45°
D. 50°
E. 55°

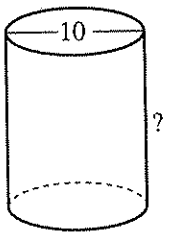
40. Parallelogram $WXYZ$ is rotated clockwise ($\circlearrowright$) by 90° about the origin. At what ordered pair is the image of Z located?

F. $(0,-c)$
G. $(-c, 0)$
H. $(0, 0)$
J. $(0, c)$
K. (a, b)

DO YOUR FIGURING HERE.

41. A liter is 1,000 cubic centimeters. Which of the following is closest to the height, in centimeters, of a cylindrical container, shown below, with diameter 10 cm and capacity 1 liter?

(Note: The volume of a cylinder with radius r and height h is $\pi r^2 h$.)



A. 4
B. 8
C. 10
D. 13
E. 16

42. For World Literature class, Lenka must read *Anna Karenina* in 8 days. She reads $\frac{1}{12}$ of the book each of the first 3 days. For the remaining 5 days, what fraction of the book, on average, must Lenka read per day?

F. $\frac{1}{8}$
G. $\frac{1}{12}$
H. $\frac{1}{20}$
J. $\frac{3}{20}$
K. $\frac{3}{25}$

43. Which of the following equations shows a correct use of the quadratic formula to solve $x^2 - 5x + 3 = 0$?

A. $x = \frac{5 \pm \sqrt{25 - 4(1)(3)}}{2(1)}$
B. $x = \frac{5 \pm \sqrt{25 + 4(1)(3)}}{2(1)}$
C. $x = \frac{-5 \pm \sqrt{25 - 4(1)(-3)}}{2(1)}$
D. $x = \frac{-5 \pm \sqrt{25 - 4(1)(3)}}{2(1)}$
E. $x = \frac{-5 \pm \sqrt{25 + 4(1)(3)}}{2(1)}$

DO YOUR FIGURING HERE.

44. In the standard (x,y) coordinate plane, the point $(1,-6)$ is the midpoint of the line segment with endpoints $(9,-13)$ and (a,b). What is (a,b) ?

F. $(-7,1)$
G. $(-7,-25)$
H. $(7,-1)$
J. $(4,-3.5)$
K. $(5,-9.5)$

45. A straight 10-foot-tall ladder is leaning against a house at an angle of 75°, as shown in the figure below. Which of the following expressions gives the distance, in feet, the base of the ladder is from the house along the level ground?

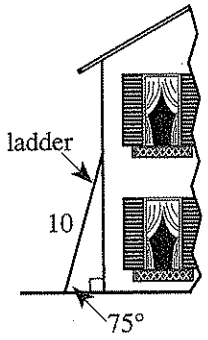
A. $10 \sin 75°$

B. $10 \cos 75°$

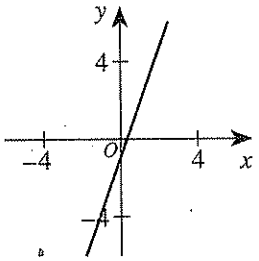
C. $10 \tan 75°$

D. $\frac{10}{\cos 75°}$

E. $\frac{10}{\tan 75°}$



46. One of the following equations is graphed in the standard (x,y) coordinate plane below. Which one?



F. $y = -\frac{1}{3}x - 2$

G. $y = \frac{1}{3}x - 1$

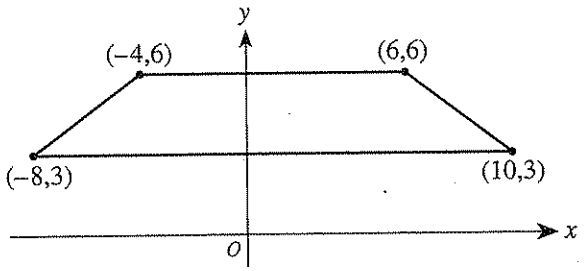
H. $y = -x + 1$

J. $y = -3x + 2$

K. $y = 3x - 1$

DO YOUR FIGURING HERE.

47. The vertices of a trapezoid have the (x,y) coordinates indicated in the figure below. What is the area, in square coordinate units, of the trapezoid?



A. 20
B. 36
C. 38
D. 42
E. 70

48. Mr. Cleary's algebra class is discussing slopes of lines. The class is to graph the total cost, C, of buying h hamburgers that cost 99¢ each. Mr. Cleary asks the class to describe the slope between any 2 points (h,C) on the graph. Devon gives a correct response that the slope between any 2 points on this graph is always:

F. zero.
G. the same positive value.
H. the same negative value.
J. a positive value, but the value varies.
K. a negative value, but the value varies.

49. The first 3 terms of a geometric sequence are 4, 10, and 25. What is the next term in the sequence?

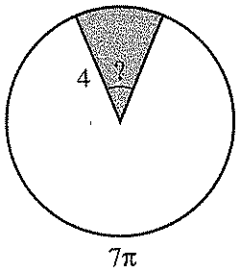
A. 35
B. 40
C. 55
D. 62.5
E. 70

50. The volume of a cube is 64 cubic centimeters. What is the total surface area, in square centimeters, of the cube?

F. 16
G. 24
H. 64
J. 96
K. 384

DO YOUR FIGURING HERE.

51. In the figure below, a sector is shown shaded in a circle with radius 4 decimeters. The length of the arc of the unshaded sector is 7π decimeters. What is the measure of the central angle of the shaded sector?



A. 35°
B. 40°
C. 45°
D. 50°
E. 55°

52. In the standard (x,y) coordinate plane, the graph of which of the following equations is a circle with center $(4,-2)$ and radius 3 coordinate units?

F. $(x+4)^2+(y-2)^2=3$
G. $(x-4)^2+(y+2)^2=3$
H. $(x+4)^2+(y+2)^2=9$
J. $(x+4)^2+(y-2)^2=9$
K. $(x-4)^2+(y+2)^2=9$

53. In $\triangle ABC$, the measure of $\angle A$ is 47°, the measure of $\angle B$ is 76°, and the length of $\overline{BC}$ is 18 centimeters. Which of the following is an expression for the length, in centimeters, of $\overline{AC}$?

(Note: The law of sines states that for any triangle, the ratios of the lengths of the sides to the sines of the angles opposite those sides are equal.)

A. $\frac{\sin 47°}{18 \sin 76°}$
B. $\frac{\sin 76°}{18 \sin 47°}$
C. $\frac{18 \sin 47°}{\sin 76°}$
D. $\frac{18 \sin 76°}{\sin 47°}$
E. $\frac{(\sin 47°)(\sin 76°)}{18}$

DO YOUR FIGURING HERE.

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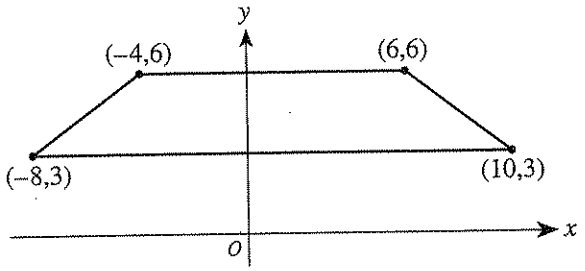

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H. the same negative value.
J. a positive value, but the value varies.
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C. 55
D. 62.5
E. 70

50. The volume of a cube is 64 cubic centimeters. What is the total surface area, in square centimeters, of the cube?

F. 16
G. 24
H. 64
J. 96
K. 384

DO YOUR FIGURING HERE.

54. The side of a square is l meters longer than the side of a second square. How many meters longer is the diagonal of the first square than the diagonal of the second square?

F. $\sqrt{2}l$
G. $2l$
H. $4l$
J. l
K. l^2

55. If $x \leq 2$, then $|x-2| = ?$

A. 0
B. $x+2$
C. $x-2$
D. $-x-2$
E. $-x+2$

56. There are 25 buildings on Elm Street. Of these 25 buildings, 10 have fewer than 6 rooms, 10 have more than 7 rooms, and 4 have more than 8 rooms. What is the total number of buildings on Elm Street that have 6, 7, or 8 rooms?

F. 5
G. 9
H. 11
J. 14
K. 15

57. If $\cos x = -\frac{1}{3}$, what is the value of $\cos 2x$?

$\left(\text{Note: } (\cos x)^2 = \frac{1+\cos 2x}{2}\right)$

A. $-\frac{8}{9}$
B. $-\frac{7}{9}$
C. $-\frac{1}{6}$
D. $\frac{1}{9}$
E. $\frac{1}{6}$

58. Let $f(x) = \sqrt{x}$ and $g(x) = 10x + b$. In the standard (x,y) coordinate plane, $y = f(g(x))$ passes through $(4,6)$. What is the value of b ?

F. −4
G. −14
H. −36
J. −37
K. −38

DO YOUR FIGURING HERE.

59. A plane contains 11 horizontal lines and 11 vertical lines. These lines divide the plane into disjoint regions. How many of these disjoint regions have a finite, nonzero area?

A. 100
B. 110
C. 144
D. 156
E. 169

60. When a, b, and c are real numbers and $ab^2c^4 > 0$, which of the following *must* be greater than 0 ?

F. ac^2
G. ac
H. ab
J. abc
K. bc

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

READING TEST

35 Minutes—40 Questions

DIRECTIONS: There are four passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

Passage I

PROSE FICTION: This passage is adapted from the novel *Mr. Ives' Christmas* by Oscar Hijuelos (©1995 by Oscar Hijuelos).

Although Edward Ives had never been the most talented of artists, as he'd tell his son, Robert, years later, he had a highly developed work ethic. A conscientious and self-effacing laborer, ever humble before his craft, he never thought he'd have any money and figured out, as a young man, that he would always live humbly, "without means," practicing his illustrative and painterly skills into his old age. And if he was lucky, getting along on numerous fleeting jobs, he might one day have a show of beautiful portraits. Perhaps he would make enough money to see something more of the world than just the view from his window or where the trains and subways of the mass transit system would take him. Paris, Tahiti, Rome—names that he associated with artists and adventure. That was all he wanted.

Before the war, as a teenager just trying to figure out a little more about the world, when he was not working in his father's printing plant, Edward Ives had also held other jobs. For a time he had been an usher in a big movie house on Ocean Avenue several days a week. It was a job he did not mind because he loved gangster stories and Westerns and animated cartoons. And he enjoyed wearing a velvet-buttoned dark gray outfit and escorting the perfumed pretty girls down to their seats. He fell in love every week but was too shy to do anything about it. He also painted window displays and made special signs for local Brooklyn merchants, and worked in stores like Macy's doing the same. He picked up a little extra money working as an occasional messenger boy, and sometimes worked as a temporary mail sorter in the post office. Every so often he had gone to work for the Steichman brothers, whose animation studio was down on Lafayette Street.

(For his part, Ives had most enjoyed his on-and-off job with the Steichmans. It was an obscure studio, the big animation houses being out in California—Disney, Lantz, Warner Bros.—and it produced mainly kiddie melodramas, its characters bugs and tender animals with cute names like "Mike and Moth," "Zippy the Squirrel," or "Trinket the Tomcat," creations that never really made it with the public.)

Then World War II had come. He did his bit as a civilian employee with a unit of the Army Information Service out in Secaucus, New Jersey, where he worked for three years during the war, churning out instructional comics with titles like "Hygiene at Sea," pamphlets, and posters about everything from malaria to dental hygiene.

Sometimes while resting, traffic noise would take him back to his early days in Manhattan, after the war, when he lived in a walk-up on Fiftieth Street, as a plodding, ever slow but first-rate freelancer, who fell in love with Annie MacGuire. He would see his old radio, which he'd hauled up out of the street and fixed with some new tubes from the corner store; and next to that their rust-bladed electric fan, which used to make the living room, an oven in the summers, a little more bearable; and then his old drawing board and the little cuckoo clock, in which they'd stash their savings, five- and ten-dollar bills. A Chinese screen, and then, later on, the crib in which his son, Robert, or Roberto as he'd call him, would sleep. Adorable and ever so tender, on his back, little feet up, his face would go into delighted contortions when Ives, the shyest and most reticent father in the world, would stand over him and touch his belly.

Thinking about Robert, Ives would always fondly remember those evenings he spent in 1948, at the Art Students League. After a day freelancing, he'd walk in and sit in the back, his sketchbook, charcoals, and pencils set out before him. And often enough he'd notice that among the twenty or so students there sat the quiet Annie MacGuire, whose intensity and concentration had always impressed him. The few times he had spied her work he had been struck by the simplicity and elegance of her drawing. He did not know much about her, other than what he'd once overheard her saying during one of the breaks, when the artists would congregate out in the hall. That she was an art and English teacher at a school on the Upper East Side, her pay lousy. She liked books, he'd noticed, and was probably taking a night course in literature, because she always walked in with thick novels, PROPERTY OF HUNTER COLLEGE stamped on them.

When she'd walk into the studio, her portfolio in hand, she'd barely acknowledge the presence of others. Ives couldn't tell if she was a snob or simply private.

1. The events in the passage are described primarily from the point of view of a narrator who presents the:
   - **A.** inner thoughts and feelings of Ives exclusively.
   - **B.** inner thoughts of Ives and MacGuire exclusively.
   - **C.** thoughts of Ives, his employers, and his classmates as expressed in dialogue.
   - **D.** inner thoughts and feelings of all the characters in the life of Ives.

2. The passage supports all of the following statements about the Steichman brothers' business EXCEPT that:
   - **F.** it was a small animation studio compared to the big ones in California.
   - **G.** it produced cartoons that were shown in the theater where Ives was an usher.
   - **H.** Ives worked there on an irregular basis.
   - **J.** it created characters that included tender and cute animals.

3. Which of the following questions is NOT answered by the passage?
   - **A.** What kind of work did Ives do in his father's printing plant?
   - **B.** Did a relationship ever develop between Ives and MacGuire?
   - **C.** As an infant, how did Robert respond to his father's gentle attention?
   - **D.** In what setting did Ives first become aware of MacGuire?

4. One of the main ideas of the second paragraph (lines 16–33) is that:
   - **F.** as a young man, Ives frequently changed jobs because employers found his work unsatisfactory.
   - **G.** Ives's work at a movie theater earned him the attention of the Steichman brothers.
   - **H.** to get to know the world around him, Ives held a variety of jobs as a young man.
   - **J.** working many jobs at once, Ives lost important chances to advance his art career.

5. According to the passage, all of the following were aspects of Ives's job at the movie theater EXCEPT:
   - **A.** wearing a dark gray outfit.
   - **B.** being able to see gangster movies.
   - **C.** escorting girls to their seats.
   - **D.** painting window displays.

6. In the passage, the statement that MacGuire's artwork is characterized by simplicity and elegance is best described as the opinion of:
   - **F.** Ives that he expresses to her in an effort to impress her.
   - **G.** Ives that he forms at the Art Students League.
   - **H.** MacGuire that she states to her classmates in hopes that Ives will agree.
   - **J.** Ives that replaced his initial impression of her work as being too cute for his taste.

7. The passage indicates that Ives's primary response to the events described in the sixth paragraph (lines 67–84) is:
   - **A.** disappointment over a painful personal loss.
   - **B.** warmth rising from a treasured memory.
   - **C.** confusion over the direction his life has taken.
   - **D.** satisfaction from completing a work of fine art.

8. According to the passage, as a young man, Ives had a vision of success for himself that included:
   - **F.** becoming a Hollywood cartoonist.
   - **G.** moving to a house in the country.
   - **H.** having a show of beautiful portraits.
   - **J.** having his artwork published in a national magazine.

9. The passage indicates that compared to his work at the movie theater, Ives found his work for the Steichman brothers to be:
   - **A.** more enjoyable.
   - **B.** less enjoyable.
   - **C.** more profitable financially.
   - **D.** less profitable financially.

10. That MacGuire was enrolled in a literature class was:
    - **F.** an inference Ives made based on his observation of what she brought to art class.
    - **G.** a fact she mentioned to her art school classmates as a way of suggesting her superiority to them.
    - **H.** a detail that Ives learned from a classmate who had discovered that Ives was fond of MacGuire.
    - **J.** a comment she made to overcome an awkward silence in her first conversation with Ives.

Passage II

SOCIAL SCIENCE: This passage is adapted from the article "In a Lonely Place" by Martha Nussbaum (©2006 by The Nation).

Nussbaum is reviewing the biography *The Solitude of Self* by Vivian Gornick.

In 1840 the young Elizabeth Cady Stanton attended the World Anti-Slavery Convention in London with her new husband, an abolitionist politician. At least she tried to attend it. On her arrival at the convention site, the people in charge refused to seat her because she was a woman. All the women were required to withdraw to the periphery, where, Vivian Gornick writes in her new book on Stanton, *The Solitude of Self*, "they could see but not be seen, hear but not be heard." Most of the men, including her husband, went along with this arrangement, unwilling to complicate discussion of the all-important antislavery issue. Only a few, notably the prominent abolitionist William Lloyd Garrison, refused to participate on terms that excluded women. Stanton recalled later that it was on this day that she realized for the first time that "in the eyes of the world I was not as I was in my own eyes, I was only a woman."

So began the career of one of America's greatest radicals. Perhaps, however, it really began much earlier. When Stanton, around age 12, heard of a local woman who had suffered outrageous but legally sanctioned injustice at the hands of her dead husband's son, she grabbed a knife and cut the offending passage out of the law book on her father's desk. Her father told her that she could work to change the law but that, in Gornick's words, defacing the book was "not only forbidden . . . it was also useless." She reflects that at this point it was "already too late: an educated, upright, law-and-order household had spawned a daughter who was going to cut the laws out of the books with a knife."

Gornick loves Stanton's uncompromising radicalism, her inextinguishable and rather joyous sense of outrage. In this woman who raised seven children during the day and wrote at night, her prolific output fueled by an abiding passion for justice, Gornick finds the archetype of the feminist movement she knew in the 1970s, with its creative energy, its excitement at having identified the problem to be solved. Stanton, Gornick argues, is the model for this revolutionary feminism, because she was the one who always refused to scale back her just demands out of political expediency, who remained faithful to the radical vision of full equality.

Stanton's revolutionary life was not entirely happy. Although she and her husband initially shared political passions, they gradually grew apart, and the whole abolitionist movement, with its insistence that slavery had to be the sole focus of attention, came to seem to her deeply compromised. Stanton's radical demand for equality for both blacks and women lost her, moreover, the friendship of many feminist women, who were willing to postpone the suffrage fight to be on good terms with powerful men and to preserve solidarity with the abolitionist cause. Nonetheless, Stanton loved her life and her enduring friendships, and she loved her struggle. In 1878, after recalling the exhausting efforts she and other feminists had expended in the cause, she then says, "And all our theme is as fresh and absorbing as it was the day we started. . . . In this struggle for justice we have deepened and broadened our own lives, and extended the horizon of our vision."

Gornick's account of Stanton's life is exhilarating and deftly written. She follows Stanton from her rebellious childhood through the early days of her engagement with abolitionism to that moment of conversion in London when she realizes that women aren't respected, even in the abolitionist movement. From there, the road leads to the famous meeting at Seneca Falls in 1848, the first women's rights convention in the United States, when Stanton boldly showed her radical colors, demanding suffrage for women. The next fifty-four years (she died in 1902) were filled with passionate speech-making and activism, as Stanton traveled tirelessly around the country on the lecture circuit with her friend Susan B. Anthony. In one seven-month period, for example, they lectured 148 times in 140 towns in ten states. Gornick vividly conveys the combination of constructive anger and ceaseless activity that marked Stanton's relationship to the world around her, and she makes her refusal to surrender her radical demands seem deeply right. Gornick makes a good case that Stanton is indeed the key precursor to the feminist movement of the late twentieth century, which refused to compromise while at the same time maintaining a hopeful attitude to the potential of law as a force for social reform.

11. The passage's author most strongly implies that over time, Stanton's relationship with her husband:

- **A.** grew gradually stronger as they found a shared passion in abolitionism.
- **B.** grew gradually weaker as their interests and priorities diverged.
- **C.** worsened after an 1840 antislavery convention in London, then slowly improved.
- **D.** ended abruptly after an 1840 antislavery convention in London.

12. According to the passage, who approved of the action described in lines 6–10?

- **F.** Garrison
- **G.** Stanton herself
- **H.** Gornick
- **J.** Most of the men at the 1840 antislavery convention in London

13. As portrayed in the passage, the reaction of Stanton's father to her cutting out a passage from a book is best described as:

A. proud and thankful.
B. concerned but hopeful.
C. sympathetic but critical.
D. angry and afraid.

14. In the statement in lines 28–31, Gornick most strongly stresses:

F. the love for the law and education that Stanton shared with her father.
G. how overprotective parents led Stanton to act out at home and at school.
H. how a happy home life led Stanton to become involved in political activism.
J. the contrast between Stanton's conventional home life and her rebellious behavior.

15. According to the passage, Gornick believes that Stanton is the model for the type of feminism found in the 1970s because Stanton:

A. wanted nothing more than a quiet, private life as a writer and parent.
B. tempered her passion for justice with a sense of compassion.
C. refused to compromise her strongly held, radical belief in full equality.
D. was realistic about the limits of what reformers could accomplish.

16. The passage most strongly suggests that Stanton looked back on her life with:

F. deep satisfaction.
G. reluctant acceptance.
H. mild regret.
J. weary bitterness.

17. Lines 15–18 most nearly mean that Stanton:

A. had been aware since childhood of the restrictions that society placed on women.
B. abruptly discovered that just being a woman reduced her value in many people's eyes.
C. was devastated to learn that even Garrison thought less of her because she was a woman.
D. slowly began to question whether women had fewer rights than men because of their gender.

18. The passage's author characterizes Stanton at the Seneca Falls convention most nearly as:

F. uncharacteristically outspoken on the issue of women's suffrage.
G. surprisingly unclear about her position on voting rights for women.
H. boldly engaged in a range of issues related to women's rights.
J. impressively insistent on the right of women to vote.

19. For the passage's author, lines 75–77 mainly serve to support her earlier point that:

A. Stanton and Anthony were close friends who enjoyed travel.
B. Stanton was a relentless promoter of the causes she believed in.
C. lectures were a popular form of entertainment in the nineteenth century.
D. Stanton ruined her health in the cause of feminism.

20. Another reviewer of Gornick's book sums up Stanton in this way:

> An icon of the American feminist movement, Elizabeth Cady Stanton devoted her life to the cause of women's suffrage, . . . traveling ceaselessly, speaking passionately about the issue that she felt should define her generation.

How does this account of Stanton compare to that of the passage's author?

F. Both offer a similar and positive assessment of Stanton's work as a feminist.
G. Both offer a similar and negative assessment of Stanton's work as a feminist.
H. This account stresses Stanton's commitment to women's suffrage, while the passage's author questions it.
J. This account mentions Stanton's extensive travel, while the passage's author doesn't.

Passage III

HUMANITIES: This passage is adapted from the memoir *My Heart Is in the Earth: True Stories of Alabama and Mexico* by Wayne Greenshaw (©2001 by Wayne Greenshaw).

Hank Williams was a popular singer and writer of country music in the 1940s and 50s.

In the summertimes of my youth, my younger brother, Donnie Lee, and I rode with Daddy, a traveling salesman, when he traveled Alabama and east Mississippi, stopping at barber and beauty shops, bringing them the latest stainless steel razors, smelly perfumed wave lotion, the fanciest new dryers, and a tonic that would plaster hair to the scalp while turning it dark brown.

It was on a highway in south Alabama that we were passed one afternoon by a pink Cadillac with a pair of cowboy boots sticking out the rear window. "That's ol' Hank," Daddy said.

Donnie Lee and I looked at each other, puzzled.

"In a minute or two there'll be another one just like that," Daddy said.

Donnie Lee questioned his statement.

But, sure enough, in a few minutes, the first car's twin, down to the snazzy fins shining brightly in the sunlight, passed us with a beep of its horn. Daddy answered and shot an abbreviated wave.

In the next town we found the two Cadillacs parked side by side facing the curb outside the drugstore. Daddy pulled his car parallel to them. We followed him inside, where a skinny man wearing a white cowboy hat rose from the table where he sat with three friends and, grinning from ear to ear, greeted Daddy like a long lost relative. They hugged and carried on, Daddy introducing us as his "number one assistants," and told us, "Boys, this is Hank Williams, the most famous singer and songwriter ever to come out of Georgiana."

The skinny man hooted. "Now, that's about the best introduction I've ever had," he said, and ordered a round of soft drinks, which we accepted with thanks. We slunk back on the edge of the shallow breeze from the slow moving fan centered over the marble-topped table. In the shadows of glass-squared display booths we sipped our drinks while the men talked about "the road," Daddy asking where they'd played, Hank and his boys saying they'd had a big crowd down in Andalusia the night before.

With his bladed face cocked just so, the shadow of his wide-brimmed hat muting his features, Hank caught my eye and grinned and said, "What kind-a music you like, big 'un?" and I tried to hide behind my glass of soda, pushing back shyly against the glass case. "Cat got yo' tongue?" he asked, and I put my mouth to the edge of the cold glass to keep from saying anything, feeling the heat of all their eyes on me. I wished we'd never seen the Cadillacs or the men, and I wondered when Daddy was going to take us on down the road, where he said he had more shops to call on.

When I finally did glance up, I looked directly into the bluest eyes I'd ever seen on a man. His thin mouth stretched into a generous smile. "How's about you boys coming out here to the car with me?" He pushed his chair back. "I got some things for y'all."

From the trunk of one of the pink Cadillacs he took two black-and-white eight-by-ten glossy photographs of himself, scratched out, "For Wayne, a fine young man," and signed it, then did the same for Donnie Lee. As we moved to Daddy's car, he called, "You got a Victrola?" I nodded. Then he handed me a half-dozen 78 rpm records. "Y'all share 'em, okay?" I nodded.

When we returned home to Trussville on Friday, Mama questioned us about our week with Daddy. We showed her the photographs. We took the records to our room. As the first started to play, Donnie Lee made a face. I frowned and shook my head.

In memory, that trip with Daddy unwinds in shades of black-and-white colored with a streak of pink. Today, as I listen to the powerful poetic slur of his music, hitting notes that even he could not find on a scale between five parallel lines, sounding words that ring against the heart like coins dropped into a deep clear pool at the bottom of a deep dark cave, I am so moved that I am stunned almost senseless with its beauty. Somewhere between then and now I learned to fathom the depths of his genius.

"Did you hear that lonesome whippoorwill? He sounds too blue to fly. The midnight train is whining low. I'm so lonesome I could cry."

How could any eleven-year-old ever know the naked strength of such words prayed to such sounds? The plaintive voice cuts to the heart that knows the secrets of being twisted and torn, battered and bruised, where the scar-tissue grates against old feelings that cannot—will not—remain hidden.

21. The point of view from which the passage is told is best described as that of someone:

- **A.** traveling with his father and brother.
- **B.** wanting to become a musician like Williams.
- **C.** reflecting appreciatively on meeting Williams.
- **D.** searching for his roots in Alabama.

22. According to the passage, which of the following events occurred last chronologically?

F. The narrator and his brother show photographs to their mother.
G. The narrator is introduced to Williams.
H. The narrator's father meets Williams.
J. The narrator is stunned by the beauty of Williams's music.

23. Through his description of his meeting with Williams, the narrator portrays Williams most nearly as:

A. up to date.
B. down to earth.
C. reserved.
D. rebellious.

24. Based on the passage, the narrator's reaction to being first addressed by Williams is one of:

F. pity and disrespect.
G. curiosity and awe.
H. pride and thankfulness.
J. bashfulness and discomfort.

25. It is reasonable to infer that, following their first experience listening to Williams's records, the narrator and his brother:

A. continued to play the records often to recapture the fond memories of meeting Williams.
B. didn't listen to the records for some time after that since they found the music unappealing.
C. shared the records with their mother, as she appeared to appreciate the music.
D. were struck at once by Williams's skillful songwriting ability.

26. The narrator compares the sound of Williams's words to the sound of:

F. "a scale between five parallel lines" (line 75).
G. "coins dropped into a deep clear pool" (lines 76–77).
H. "that lonesome whippoorwill" (line 81).
J. "the midnight train" (line 82).

27. As it is used in line 71, the word *unwinds* most nearly means:

A. relaxes.
B. unhooks.
C. disintegrates.
D. unfolds.

28. The narrator uses the simile in lines 73–79 to describe Williams's ability to:

F. convey his depth of feeling.
G. write songs that require a variety of instruments.
H. appeal to fans of all ages.
J. train his voice to make unique sounds.

29. Based on the passage, how old was the narrator when he met Williams?

A. Three
B. Eight
C. Eleven
D. Fourteen

30. It is most reasonable to infer from the passage that the narrator gains an appreciation of Williams's music primarily as a result of:

F. Williams's friendliness on the day they met.
G. his own experiences with heartache.
H. encouragement from his brother and father.
J. seeing Williams perform in concert.

Passage IV

NATURAL SCIENCE: This passage is adapted from *The Variety of Life* by Colin Tudge (©2000 by Oxford University Press).

Through all classification systems, whether devised by songbirds, professors of botany, or fishmongers, two separate sets of considerations run in parallel. The first is operational: how do you actually go about classifying? What criteria do you adopt to decide whether item A belongs in category X or category Y? A songbird weighing up a bird of prey perhaps looks for curvature of beak or length of claw—or, more probably, relies on overall impression or gestalt; and by such means it distinguishes a falcon from a duck. For chefs, succulence on the inside and a crunchy carapace on the outside are the marks of shellfish.

If the criteria are made explicit, and can be repeated by other people simply by following the instructions—if, for example, they depend on qualities that can be measured and are not judged simply according to personal taste—then those criteria can be called 'objective'. But objective criteria may also be arbitrary. I might, for example, decree that all insects with legs over 2 centimetres long should be placed in a new grouping called 'mega-insects'. The criterion would be perfectly objective, in the sense that it is explicit and repeatable, which would not be the case if I simply decreed that there should be a special category marked 'beautiful'. But although the grouping of mega-insects would be objectively defined it would also be arbitrary. Nothing very special distinguishes insects that just happen to be large, except their largeness.

Behind all classifications, too, there is inevitably a philosophy. All classifications impose some view of the world: they all make a statement. Thus a chef regards the Universe as a market: the things within it are divided up according to edibility and wholesomeness. A songbird is concerned with food, too, but also with enemies and potential mates. The many classifications devised by scientists, historically, have pursued various philosophies.

Whatever criteria we adopt, however, and whatever we are classifying and for whatever purpose, all classifications tend to follow a common pattern. The items in question are first divided into big categories, and then each big category is divided into smaller categories, and so on. The result is a series of nesting groups called a **hierarchy**: little ones grouped within bigger ones within bigger ones still. Classifications, in short, tend to be hierarchical.

Ad hoc ways of categorizing living things are useful. Long may they persist. Practical people doing practical things need to carve up the world in their own ways, and it is not for outsiders to cavil. The flesh of abalones (ear shells) and of lobsters are comparably tender even if those creatures are less closely related to each other than eagles are to sea squirts; so why not call them both 'shellfish'? A 'weed' is a useful category, as any farmer will attest. Each system of classification casts its own light upon the world; lay different classifications side by side and you illuminate from different angles, and truly begin to see in three dimensions.

But it is one thing simply to manipulate aspects of nature for our own convenience, and another to seek understanding. Of course, deeper understanding can lead to more subtle exploitation—and thus it is, for example, that increasing knowledge of microbes on the one hand and of the operation of DNA on the other, is currently bringing us the mixed but in general momentous benefits of biotechnology. But for true biologists, the real pleasure comes simply from knowing, and from the sense of coming closer to other living things. I am defining 'biologists' broadly: to include naturalists, in the old-fashioned sense, who like simply to observe nature, and scientists, who seek to explain its workings by proposing hypotheses and then testing them out. True biologists seek something more in nature than mere utility. They feel in their bones, and all their senses proclaim, that there is an *order* among living things; and it is this 'natural' order that they seek to reflect in their classifications. They feel, too, that there should be criteria for classification that are not simply arbitrary, but reflect some real and important affiliations. Thus, what is often called 'natural classification' is based on what biologists construe as the underlying order of nature; or that is the intention. Biologists (broadly defined) have been seeking to devise such a classification at least since the time of the Greek philosopher Aristotle.

31. The primary purpose of the passage is to:

- **A.** examine the hierarchical pattern for classifying items.
- **B.** delineate between classifications that impose a view of the world and those that reflect a natural order.
- **C.** examine the similarities and differences between how naturalists and biologists classify items.
- **D.** describe the process of establishing, and the limitations and usefulness of, a system of classification.

32. The main function of the second paragraph (lines 13–28) in relation to the passage as a whole is to:

- **F.** describe the characteristics and a potential weakness of objective criteria.
- **G.** introduce a new scientific concept that the remainder of the passage explores.
- **H.** argue the need for subjective criteria, such as beauty, when classifying items.
- **J.** restate a surprising fact about the origin of classification systems.

33. The author mentions abalones and lobsters in the fifth paragraph (lines 47–58) primarily to:

A. explain the dissimilarity between the two types of sea creatures.
B. criticize the impractical classification systems developed by laypeople.
C. convince the reader that "shellfish" is a useless classification.
D. show that people's everyday categorizations are useful in meeting their particular needs.

34. According to the passage, a true biologist seeks all of the following EXCEPT:

F. a sense of coming closer to other living things.
G. classifications that are mainly utilitarian.
H. classification criteria that are both genuine and important.
J. a natural order among living things.

35. According to the passage, what is the primary problem with the grouping "mega-insects"?

A. It is arbitrary and based on a relatively unimportant quality.
B. It is subjective and based on one person's practical needs.
C. It is established by a criterion that is not explicit or repeatable.
D. It is not considered by biologists to be objectively defined.

36. According to the passage, the second step in establishing a series of nesting groups is to:

F. divide each big category into smaller categories.
G. place the subcategories into one large group.
H. separate the items in question into equal groups.
J. review subgroups for overlapping characteristics.

37. As it is used in line 49, the phrase *carve up* most nearly means:

A. gouge.
B. minimize.
C. analyze.
D. inscribe.

38. In the context of the passage, the phrase "illuminate from different angles" (lines 57–58) most nearly suggests that different classification systems:

F. convey contradictory information that is confusing to people.
G. tend to spotlight categories that are less important than others.
H. provide an array of viewpoints that broadens people's understanding.
J. can be positioned side by side to pinpoint an item's most important feature.

39. The passage indicates that old-fashioned naturalists differ from scientists in that naturalists:

A. like to observe nature rather than test hypotheses about it.
B. seem to care more deeply about nature than scientists do.
C. are more interested in manipulating aspects of nature than understanding it.
D. seek to explain the intricate workings of nature through scientific tests.

40. Suppose a dog trainer typically divides her clients' dogs into two groups, "easy to train" and "difficult to train," based on her initial impressions of each dog on the first day of training. Based on the passage, the author would most likely describe this classification system as:

F. objective and easily repeated by others.
G. arbitrary and not useful to the trainer.
H. informal and inappropriately unscientific.
J. practical and meaningful to the trainer.

END OF TEST 3

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO A PREVIOUS TEST.

SCIENCE TEST

35 Minutes—40 Questions

DIRECTIONS: There are seven passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

Passage I

Two species of aquatic plants, Species A and Species B, are often found in the same freshwater lakes. Both species can grow in water up to 2 m deep. However, typically, Species A is found closer to the lake's edge in shallower water whereas Species B grows farther out in deeper water. Both species spread by means of underground stems called *rhizomes* and by means of seeds. A scientist conducted 2 studies to examine the effect of water depth on the growth of Species A and Species B plants from seeds.

Study 1

In early June, seeds from Species A and Species B were germinated. In mid-June, 24 seedlings of each species, all having shoot lengths of 3 cm to 5 cm, were transferred to identical pots (1 seedling per pot). The pots were suspended beneath the water in large outdoor tanks that were located in full sun. Eight seedlings of each species were submerged to each of 3 water depths—0.2 m, 0.4 m, and 0.8 m. In late September, the average shoot length for surviving Species A seedlings and Species B seedlings at each of the 3 water depths was determined. The results are shown in Figure 1.

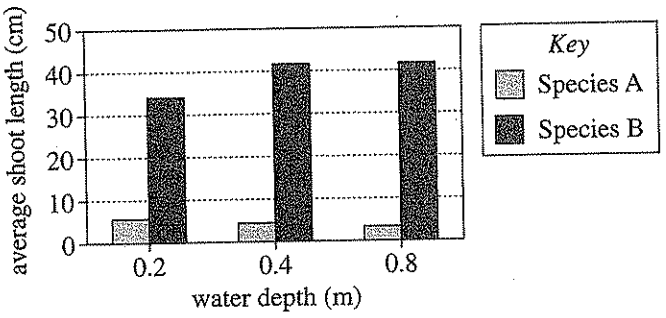


Figure 1

Study 2

Immediately after Study 1, the surviving seedlings of Species A and B were removed from the tanks, dried, and then weighed. The average dry mass of the surviving Species A seedlings from each water depth was 2.3 mg. The average dry mass of the surviving Species B seedlings from each water depth is shown in Figure 2.

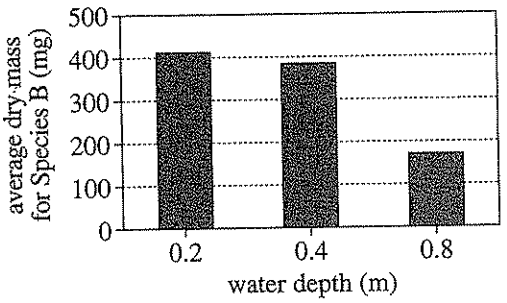


Figure 2

For each water depth, the shoot length and dry mass of each surviving Species B seedling were plotted. The best-fit curve for each set of data points is shown in Figure 3.

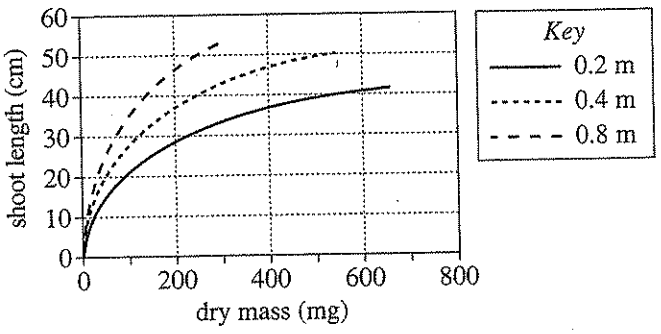


Figure 3

Figures adapted from Stefan E. B. Weisner et al., "Influence of Submergence on Growth of Seedlings of *Scirpus lacustris* and *Phragmites australis*." ©1993 by Blackwell Publishing.

1. Based on Figure 3, for a water depth of 0.8 m, the shoot length and dry mass of how many Species B seedlings were plotted?

   A. 5
   B. 8
   C. 24
   D. Cannot be determined from the given information

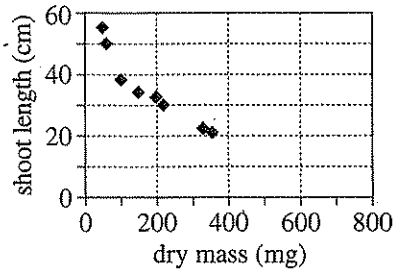
2. Suppose that a fourth group of pots containing Species B seedlings had been suspended at a water depth of 0.3 m. The average shoot length of these seedlings in late September would most likely have been:

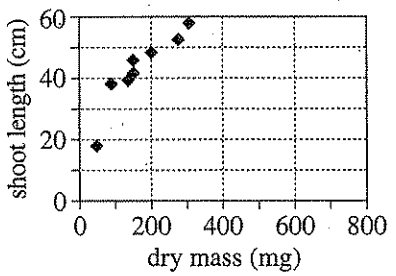
   F. less than 34 cm.
   G. between 34 cm and 42 cm.
   H. between 42 cm and 50 cm.
   J. greater than 50 cm.

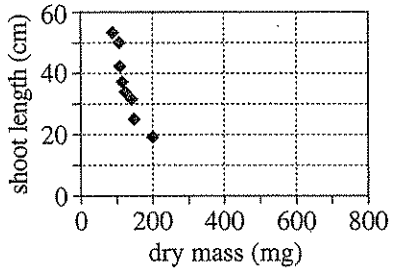
3. At the conclusion of Study 2, a seedling of Species B was found to have a dry mass of 400 mg and a shoot length of 33 cm. Based on Figure 3, this seedling most likely had been submerged at which of the following water depths?

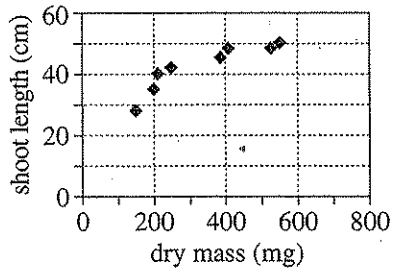
   A. 0.2 m
   B. 0.4 m
   C. 0.8 m
   D. 1.0 m

4. Which of the following sets of data points most likely yielded the best-fit curve for surviving Species B seedlings grown at a depth of 0.4 m ?

   F.
   

   G.
   

   H.
   

   J.
   

5. According to the results of Studies 1 and 2, for a given water depth, how did surviving seedlings of Species A compare to surviving seedlings of Species B ? On average, seedlings of Species A had:

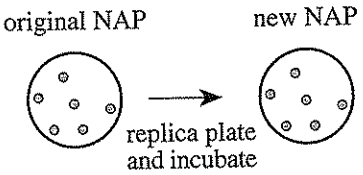
   A. longer shoot lengths and greater dry mass.
   B. longer shoot lengths but lesser dry mass.
   C. shorter shoot lengths and lesser dry mass.
   D. shorter shoot lengths but greater dry mass.

6. Of the 8 Species A seedlings grown at a water depth of 0.2 m, 6 survived. The *total* dry mass of these surviving seedlings can be calculated using which of the following expressions?

   F. 2.3 mg × 6
   G. 2.3 mg ÷ 6
   H. 2.3 mg × 8
   J. 2.3 mg ÷ 8

Passage II

S. cerevisiae (baker's yeast) cells can form *colonies* (patches of genetically identical cells) on nutrient agar plates (NAPs), each of which contains the same 20 amino acids. The pattern of colonies on 1 NAP can be reproduced on another NAP using the technique of *replica plating*. A velvet cloth is pressed onto the first NAP so that the cloth collects cells from each colony. The cloth is then pressed onto a new NAP to transfer the cells, which, when incubated, grow to form colonies (see Figure 1).



Note: ⊙ represents a colony.

Figure 1

Experiment 1

Students determined if 10 strains (Strains 1–10) of *S. cerevisiae* could grow in the absence of certain amino acids. Cells from Strain 1 were spread on an NAP, which was then incubated at 30°C for 72 hr to allow colonies to form. Cells from each colony were replica plated to each of 4 experimental plates (EPs). The EPs were identical to the NAPs except that each EP lacked 1 amino acid—either arginine (Arg), histidine (His), lysine (Lys), or leucine (Leu)—while still containing the remaining 19 amino acids. This process was also followed with Strains 2–10. All the EPs were incubated at 30°C for 72 hr and then examined for colonies (see Table 1).

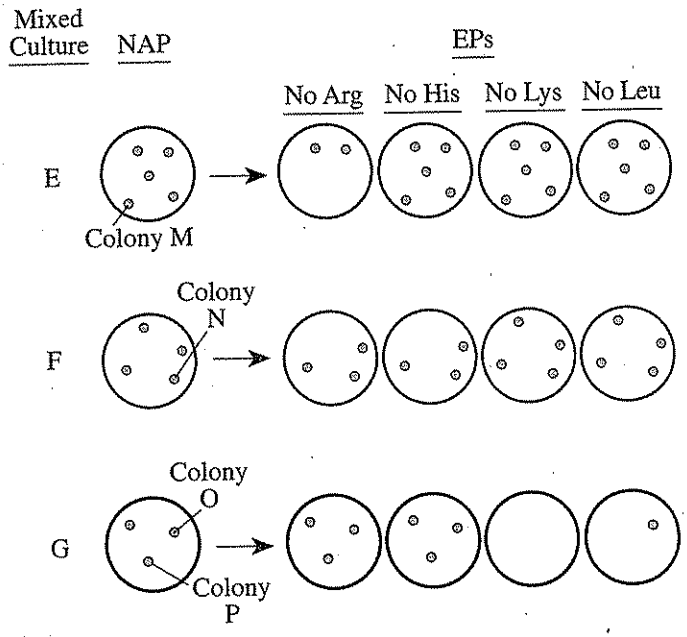
Table 1

Strain	EPs			
	No Arg	No His	No Lys	No Leu
1	+	−	+	+
2	+	+	+	−
3	−	+	+	+
4	+	+	−	+
5	+	+	−	−
6	−	−	+	+
7	+	−	+	−
8	−	+	−	+
9	−	+	+	−
10	+	+	+	+

Note: + indicates colonies formed; − indicates colonies did not form.

Experiment 2

The students tested 3 mixed cultures (Mixed Cultures E, F, and G), each containing cells from 2 of the strains tested in Experiment 1. Each mixed culture was incubated on a separate NAP until colonies formed. The colonies were then replica plated and incubated as in Experiment 1 (see Figure 2).



Note: The arrow represents replica plating and incubation.

Figure 2

7. Which of the labeled colonies shown in Figure 2 did NOT form in the absence of Leu ?

   A. Colony M
   B. Colony N
   C. Colony O
   D. Colony P

8. According to Table 1, how many of the strains tested in Experiment 1 were able to grow on the EPs that lacked histidine?

   F. 1
   G. 3
   H. 5
   J. 7

9. Which of the labeled colonies shown in Figure 2 is most likely to be from Strain 4 ?

   A. Colony M
   B. Colony N
   C. Colony O
   D. Colony P

10. Suppose cells from Strain 2 had been incubated on an EP lacking both His and Leu. Do the data in Table 1 indicate that colonies would have formed?

    F. Yes; the results shown in Table 1 indicate that Strain 2 can grow without both His and Leu.
    G. Yes; the results shown in Table 1 indicate that Strain 2 cannot grow without His.
    H. No; the results shown in Table 1 indicate that Strain 2 can grow without both His and Leu.
    J. No; the results shown in Table 1 indicate that Strain 2 cannot grow without Leu.

11. Based on Table 1 and Figure 2, which mixed culture, if any, contained cells from Strains 6 and 10 ?

    A. Mixed Culture E
    B. Mixed Culture F
    C. Mixed Culture G
    D. None of the mixed cultures

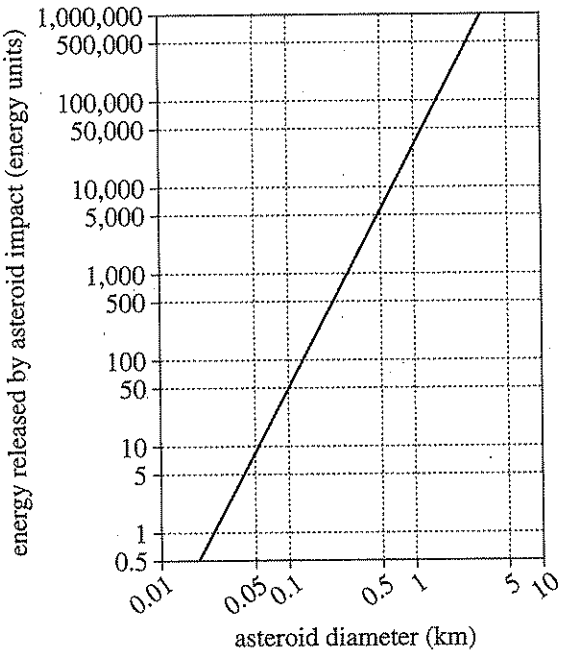
12. Before beginning the experiments, the students sterilized the velvet cloths used to transfer cells from the NAPs to the EPs. The most likely reason that the velvet cloths were sterilized was to avoid contaminating the:

    F. EPs with cells from the NAPs.
    G. EPs with cells that were not from the NAPs.
    H. velvet cloths with yeast from the NAPs.
    J. velvet cloths with bacteria from the NAPs.

Passage III

When an asteroid hits the surface of a planet or moon, an *impact crater* is formed. An asteroid that hits Earth under a specific set of conditions (including speed and angle), referred to here as Set C, forms a crater with a diameter about 20 times the asteroid's diameter. Figure 1 shows the energy released by the impact, for a range of asteroid diameters.

Figure 2 shows the average amount of time that elapses between consecutive impacts on Earth by asteroids with the same diameter, for a range of asteroid diameters. Figure 3 shows the percent of the surface of the Moon, Mercury, and Mars that is covered by impact craters, for various ranges of crater diameter.



Note: One energy unit = the energy released by the detonation of 1 million tons of TNT.

Figure 1

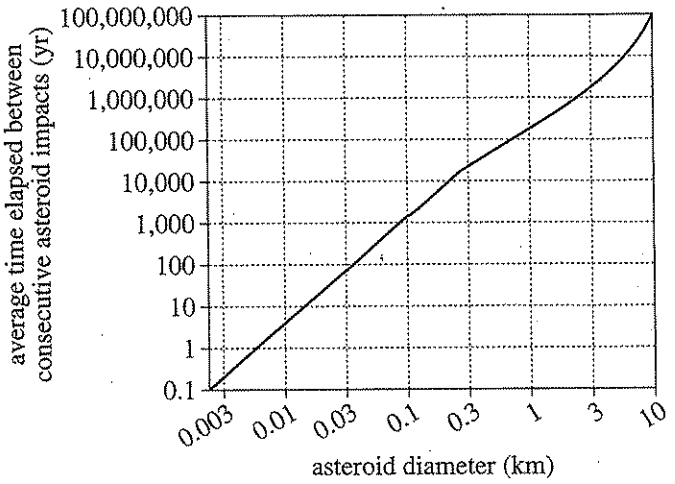


Figure 2

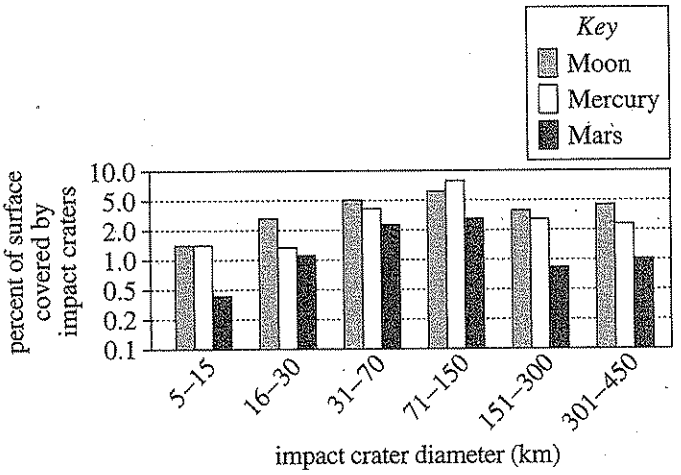


Figure 3

Figures adapted from Eugene M. Shoemaker and Carolyn S. Shoemaker, "The Role of Collisions." ©1999 by Sky Publishing Corp.

13. Suppose that 55 units of energy were released when a particular asteroid, under Set C conditions, hit Earth. According to Figure 1, the asteroid's diameter was most likely closest to which of the following?

    A. 0.05 km
    B. 0.1 km
    C. 0.5 km
    D. 1 km

14. According to Figure 2, for progressively larger asteroids, the average amount of time that elapses between consecutive impacts on Earth by asteroids with the same diameter:

    F. increases only.
    G. decreases only.
    H. varies, but with no general trend.
    J. remains the same.

15. According to Figure 3, for any given range of crater diameters, the percent of the surface of Mars that is covered by impact craters with those diameters is:

    A. less than that for Mercury or the Moon.
    B. less than that for Mercury but greater than that for the Moon.
    C. greater than that for Mercury or the Moon.
    D. greater than that for Mercury but less than that for the Moon.

16. Suppose an asteroid, under Set C conditions, hit Earth to form a crater 20 km in diameter. Based on Figure 1 and other information provided, that asteroid impact most likely released an amount of energy closest to which of the following?

    F. 1,000 energy units
    G. 3,000 energy units
    H. 10,000 energy units
    J. 30,000 energy units

17. Assume that an asteroid that hit Earth 65 million years ago was 10 km in diameter. Also assume that another 10 km asteroid will hit Earth in the future. If the amount of time that elapses between these consecutive impacts is equal to the average amount of time as given by Figure 2, a 10 km diameter asteroid will next hit Earth approximately:

    A. 35 million years from now.
    B. 65 million years from now.
    C. 100 million years from now.
    D. 135 million years from now.

Passage IV

A teacher placed 50 mL of Liquid A at 20°C in a *buret* (see Figure 1). A buret is a graduated tube with a *stopcock*. Liquid flows out of the buret when the stopcock is opened.

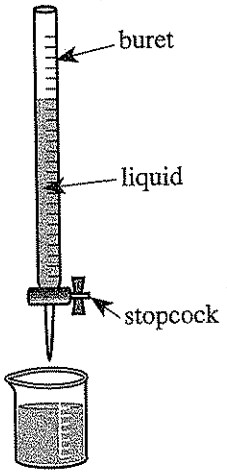


Figure 1

The stopcock was opened and the *flow time*, the time it took for 20 mL of the liquid to flow out of the buret, was measured and found to be 7 sec. The procedure was repeated with Liquid B, which had a flow time of 14 sec.

The teacher asked 3 students to try to explain why the liquids had different flow times.

Student 1

Liquid B drained more slowly than Liquid A because it is denser than Liquid A. As a liquid flows, some of its molecules bump into each other. This causes the molecules to lose speed in the direction of flow, slowing the overall flow of the liquid. Since molecules of a denser liquid are closer together than are molecules of a less dense liquid, collisions occur more often in the denser liquid. Thus, if 2 liquids are at the same temperature, the less dense liquid will always flow more easily.

Student 2

Liquid B drained more slowly than Liquid A because it has a greater *molecular mass* (the mass of each molecule) than Liquid A. Consider 2 objects of different mass. More force is required to move the object with the greater mass. Thus, if 2 liquids are at the same temperature, the liquid with the smaller molecular mass will always flow more easily.

Student 3

Liquid B drained more slowly than Liquid A because it has a larger *molecular volume* (the volume occupied by each molecule) than Liquid A. Large molecules readily bump into each other when a liquid flows, forming molecular "logjams" that slow down the overall flow. Thus, if 2 liquids are at the same temperature, the liquid with the smaller molecular volume will always flow more easily.

Table 1 gives the density, molecular mass (in atomic mass units, amu), and molecular volume (in nm^3; 1 billion nm = 1 m) for several liquids at 20°C.

Table 1

Liquid	Density (g/mL)	Molecular mass (amu)	Molecular volume (nm^3)
Acetone	0.791	58.08	0.122
DMSO	1.100	78.13	0.118
H_2O	1.000	18.02	0.030
Isopropanol	0.786	60.10	0.127
Nonane	0.718	128.3	0.297
Toluene	0.865	92.14	0.177

18. In the teacher's demonstration, as the 7 sec elapsed during the measurement of Liquid A, the height of the liquid in the buret:

F. increased only.
G. decreased only.
H. increased, then decreased.
J. decreased, then increased.

19. Based on Student 1's explanation, which of the liquids listed in Table 1 would flow most easily at 20°C ?

A. Acetone
B. DMSO
C. Nonane
D. Toluene

20. Suppose that the teacher had also tested isopropanol in the demonstration and found it to have a flow time of 11 sec. Student 1 would claim that isopropanol:

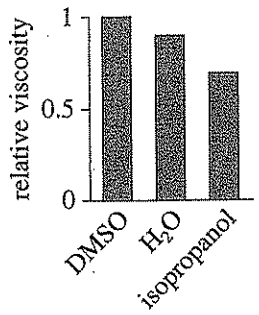
F. is more dense than Liquid A, but not as dense as Liquid B.
G. is more dense than Liquid B, but not as dense as Liquid A.
H. has a greater molecular mass than Liquid A, but a smaller molecular mass than Liquid B.
J. has a greater molecular mass than Liquid B, but a smaller molecular mass than Liquid A.

21. Is the claim "At 20°C, nonane flows more easily than acetone" consistent with Student 2's explanation?

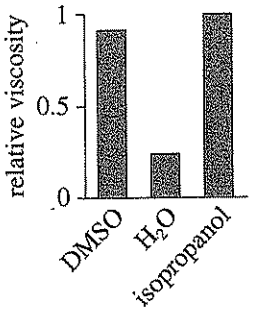
A. No, because nonane has a greater molecular mass than acetone.
B. No, because nonane has a larger molecular volume than acetone.
C. Yes, because nonane has a greater molecular mass than acetone.
D. Yes, because nonane has a larger molecular volume than acetone.

22. Which of the following graphs of the relative viscosities of DMSO, H_2O, and isopropanol is most consistent with Student 3's explanation?

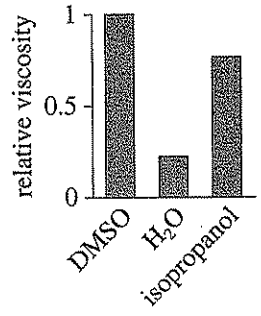
F.



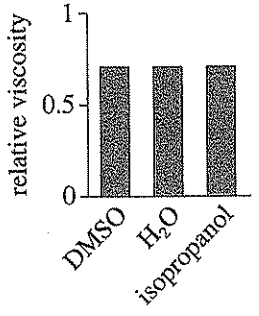
H.



G.



J.



23. Suppose that Liquid A had been isopropanol and Liquid B had been nonane. The results of the teacher's demonstration would have supported the explanation(s) provided by which student(s)?

A. Student 1 only
B. Student 2 only
C. Students 1 and 2 only
D. Students 2 and 3 only

24. Consider the data for heptane (a liquid) at 20°C shown in the table below:

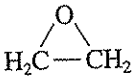
Density	Molecular mass	Molecular volume
0.684 g/mL	100.20 amu	0.243 nm^3

Which student(s), if any, would predict that heptane would have a shorter flow time than toluene at 20°C ?

F. Student 1 only
G. Students 2 and 3 only
H. Students 1, 2, and 3
J. None of the students

Passage V

Ethylene oxide, a widely used industrial chemical, has the structure shown below:



Figures 1–3 each show how a property of solutions of ethylene oxide in H_2O varies as the concentration of ethylene oxide increases at 1 atmosphere (atm) of pressure. Concentration is given as the percent ethylene oxide by mass in H_2O (% EO). Figure 1 shows how density at 10°C varies with % EO. Figure 2 shows how freezing point varies with % EO. The *bubble point* is the lowest temperature at which bubbles of gas (in this case, ethylene oxide) form in a solution. Figure 3 shows how bubble point varies with % EO.

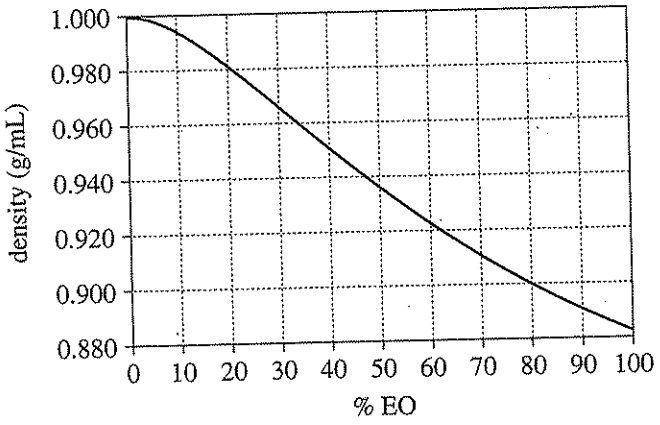


Figure 1

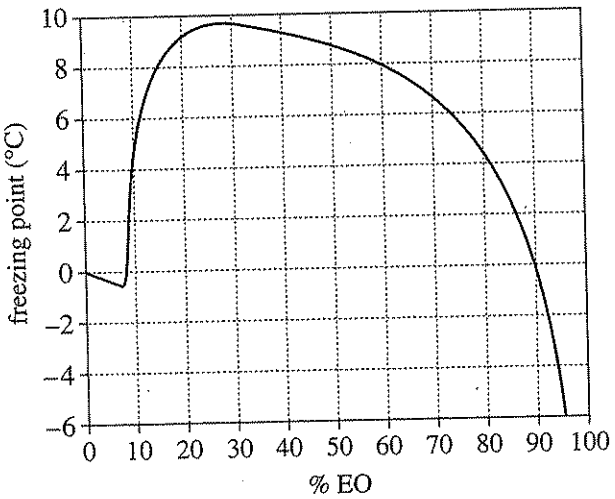


Figure 2

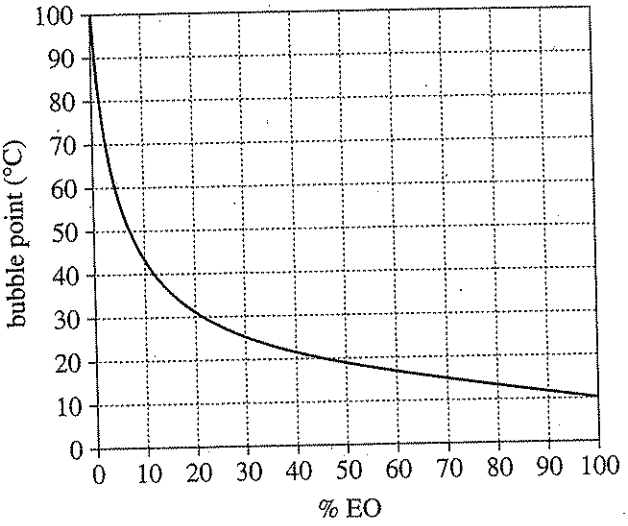


Figure 3

Figures adapted from Old World Industries, The Dow Chemical Company, Shell Chemical Company, Sunoco, Inc., and Equistar Chemicals, LP, *Ethyleneoxide* (2nd ed.). 1999.

25. According to Figure 3, the lowest temperature at which bubbles will form in a 30% EO solution at 1 atm is closest to which of the following?

A. 11°C
B. 25°C
C. 50°C
D. 97°C

26. At 10°C and 1 atm, as % EO increases from 0% to 100%, the mass per unit volume:

F. increases only.
G. decreases only.
H. increases, then decreases.
J. decreases, then increases.

27. At 1 atm, which of the following solutions will have the *lowest* melting point?

A. 20% EO
B. 40% EO
C. 60% EO
D. 80% EO

28. According to Figures 2 and 3, at 1 atm, a solution of ethylene oxide in H_2O that has a bubble point of 15°C will have a freezing point closest to which of the following?

F. 0°C
G. 3°C
H. 7°C
J. 10°C

29. Based on Figure 2, at 1 atm, which of the following solutions has a freezing point closest to the freezing point of pure H_2O ?

A. 11% EO
B. 39% EO
C. 61% EO
D. 89% EO

Passage VI

In a rain cloud, small particles called *cloud condensation nuclei* (CCN) attract nearby water droplets to form a *cloud droplet*. A cloud droplet grows by attracting more water droplets until it becomes a *raindrop*, which then falls from the cloud. Rainfall can be increased by seeding the cloud with additional small particles, such as NaCl particles, to act as CCN.

Over a year, 2 studies of cloud-seeding were done at a subtropical location, using every cumulus cloud that was isolated from other clouds, that had a top at an altitude between 3,350 m and 4,900 m, and that had a liquid water content of at least 0.5 g/m^3.

Study 1

Four types of flares (A–D) were used. Flares of each type, when ignited, released NaCl particles having a specific distribution of particle sizes (see Table 1).

Table 1

Flare Type	Percent of NaCl particles having diameters (μm*):			
	0.1–0.5	0.6–1.0	1.1–2.0	2.1–5.0
A	64	15	12	9
B	72	12	9	7
C	81	9	6	4
D	90	5	3	2

*μm = 10^{-6} m

A plane carrying all 4 types of flares was sent into the base of each cloud. As the plane entered the base of a cloud, a computer determined whether or not to immediately ignite at least 1 flare, seeding the cloud. The computer also selected which type of flare to ignite, and how many flares to ignite to introduce a concentration of 10, 100, 1,000, or 10,000 particles/cm^3 into the cloud. The average amount of rainfall from the seeded clouds for each type of flare and at each concentration is shown in Figure 1.

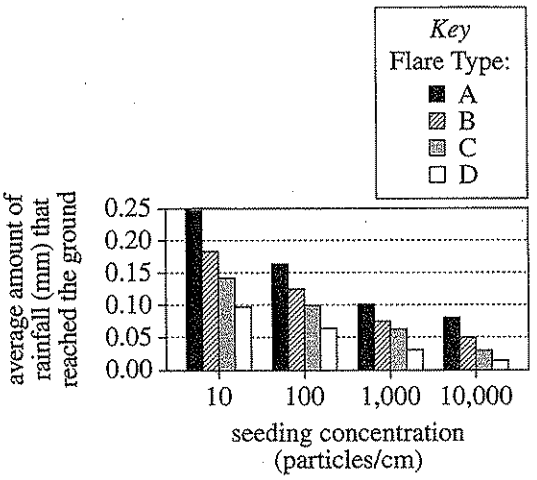


Figure 1

Table 1 and Figure 1 adapted from Y. Segal et al., "Effects of hygroscopic seeding on raindrop formation as seen from simulations using a 2000-bin spectral cloud parcel model." ©2004 by Elsevier B. V.

Study 2

Radar was used to monitor how the mass of raindrops within each cloud changed over the 55 minutes following the time the plane entered the base of the cloud. The averaged results for all the unseeded clouds and for all the seeded clouds are shown in Figure 2.

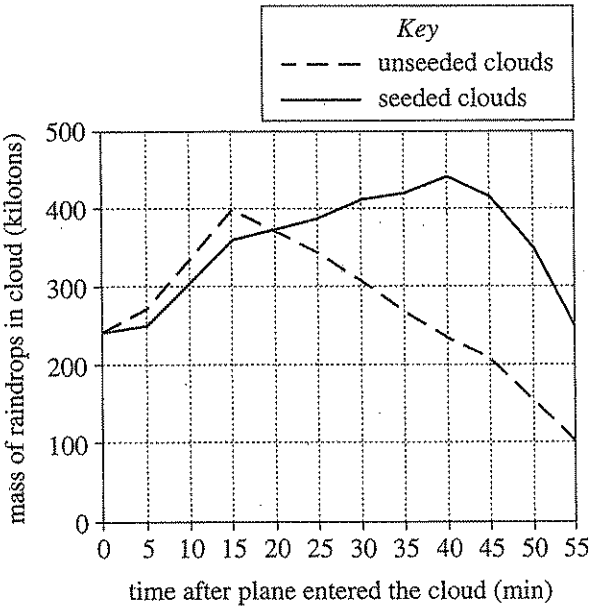


Figure 2

Figure 2 adapted from G. K. Mather et al., "Results of the South African Cloud-Seeding Experiments Using Hygroscopic Flares." ©1997 by American Meteorological Society.

30. According to the results of Study 1, as the seeding concentration increased, the average amount of rainfall that reached the ground:

- **F.** increased for all 4 types of flares.
- **G.** increased for Flare Types A and B, but decreased for Flare Types C and D.
- **H.** decreased for all 4 types of flares.
- **J.** decreased for Flare Types A and B, but increased for Flare Types C and D.

31. Based on the passage, what is the correct order of raindrops, water droplets, and cloud droplets according to their diameters, from smallest to largest?

- **A.** Water droplet, raindrop, cloud droplet
- **B.** Water droplet, cloud droplet, raindrop
- **C.** Raindrop, water droplet, cloud droplet
- **D.** Raindrop, cloud droplet, water droplet

32. According to the results of Study 2, how did the raindrops in the seeded clouds differ from the raindrops in the unseeded clouds with respect to their maximum mass?

- **F.** It took more time for the raindrops in the seeded clouds to reach a maximum mass, and they reached a greater maximum mass.
- **G.** It took less time for the raindrops in the seeded clouds to reach a maximum mass, and they reached a greater maximum mass.
- **H.** It took more time for the raindrops in the seeded clouds to reach a maximum mass, and they reached a lesser maximum mass.
- **J.** It took less time for the raindrops in the seeded clouds to reach a maximum mass, and they reached a lesser maximum mass.

33. The design of Study 1 differed from the design of Study 2 in that in Study 1, the:

- **A.** rainfall from a cloud was measured, whereas in Study 2, the particle-size distribution in types of flares was determined.
- **B.** mass of raindrops in a cloud was determined, whereas in Study 2, the particle-size distribution in types of flares was determined.
- **C.** rainfall from a cloud was measured, whereas in Study 2, the mass of raindrops in a cloud was determined.
- **D.** mass of raindrops in a cloud was determined, whereas in Study 2, rainfall from a cloud was measured.

34. Which of the following statements gives the most likely reason that clouds with tops above an altitude of 4,900 m were *not* included in the studies? Above 4,900 m in such clouds, there would be present:

- **F.** only water vapor.
- **G.** only water droplets.
- **H.** ice crystals but few water droplets.
- **J.** water droplets but few ice crystals.

35. Which of the following statements about the particle-size distribution in the 4 types of flares is supported by Table 1 ?

- **A.** For all 4 types of flares, the majority of particles belonged to the largest size category.
- **B.** For all 4 types of flares, the majority of particles belonged to the smallest size category.
- **C.** For Flare Types A and B, the majority of particles belonged to the largest size category, whereas for Flare Types C and D, the majority of particles belonged to the smallest size category.
- **D.** For Flare Types A and B, the majority of particles belonged to the smallest size category, whereas for Flare Types C and D, the majority of particles belonged to the largest size category.

Passage VII

An *RCL circuit* contains an alternating current (AC) power supply, a resistor having a resistance R, a capacitor having a capacitance C, and an inductor having an inductance L (see Figure 1).

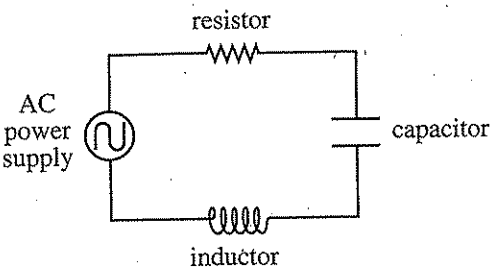


Figure 1

The capacitor and inductor each possess *impedance*, a type of electrical resistance. The *angular frequency* of the current, ω, is a measure of the number of times each second that the current reverses direction.

Figure 2 shows, for specific values of C, L, and average voltage, V, how the average current, I, varies with ω and with R.

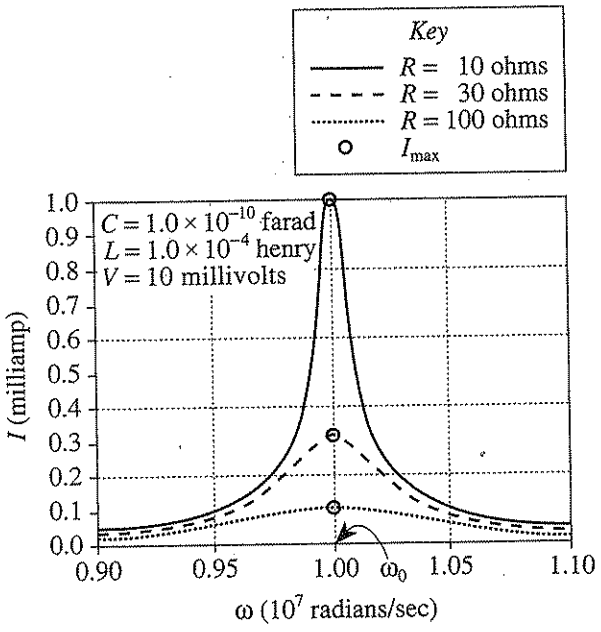


Figure 2

Figure 2 adapted from David Halliday and Robert Resnick, *Physics, Part 2*, 3rd ed. ©1978 by John Wiley and Sons, Inc.

For a given R, the peak average current, I_{max}, occurs at the *resonant angular frequency*, ω_0.

Figure 3 shows how ω_0 varies with L and C.

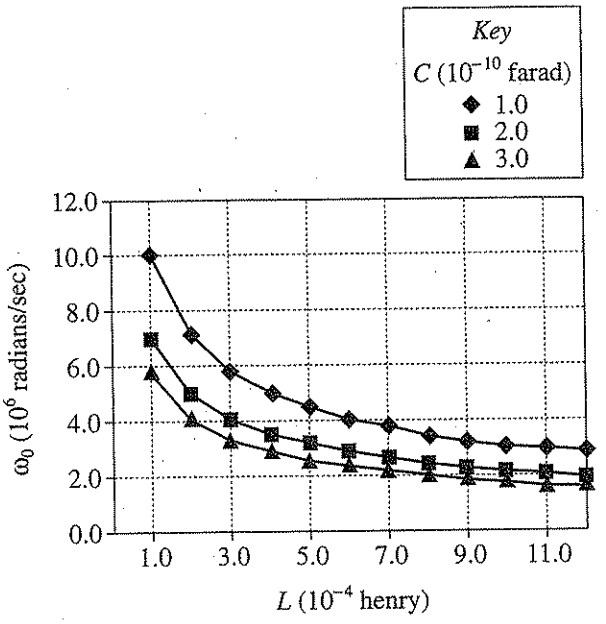


Figure 3

36. What is the resonant angular frequency of the RCL circuit for the conditions given in Figure 2 ?

F. 0.90×10^7 radians/sec
G. 0.95×10^7 radians/sec
H. 1.00×10^7 radians/sec
J. 1.05×10^7 radians/sec

37. According to Figure 3, for $C = 1.0 \times 10^{-10}$ farad, as L increases, ω_0:

A. increases only.
B. decreases only.
C. varies, but with no general trend.
D. remains the same.

38. For the conditions specified in Figure 2 and $R = 30$ ohms, the resistor will generate the greatest amount of heat when ω is closest to which of the following values?

F. 0.90×10^7 radians/sec
G. 0.95×10^7 radians/sec
H. 1.00×10^7 radians/sec
J. 1.05×10^7 radians/sec

39. According to Figure 2, does ω_0 vary with R ?

A. Yes; as R increases, ω_0 decreases.
B. Yes; as R increases, ω_0 remains the same.
C. No; as R increases, ω_0 increases.
D. No; as R increases, ω_0 remains the same.

40. For a given L, what is the correct ranking of the values of C in Figure 3, from the C associated with the lowest ω_0 to the C associated with the highest ω_0 ?

F. 1.0×10^{-10} farad, 2.0×10^{-10} farad, 3.0×10^{-10} farad
G. 1.0×10^{-10} farad, 3.0×10^{-10} farad, 2.0×10^{-10} farad
H. 2.0×10^{-10} farad, 3.0×10^{-10} farad, 1.0×10^{-10} farad
J. 3.0×10^{-10} farad, 2.0×10^{-10} farad, 1.0×10^{-10} farad

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

Form 68G (April 2010)
Weimaraner

English

1) B
2) H
3) A
4) J
5) B
6) G
7) B
8) F
9) C
10) J
11) D
12) G
13) A
14) H
15) C
16) J
17) A
18) H
19) A
20) F
21) D
22) H
23) B
24) J
25) C
26) H
27) D
28) J
29) A
30) H
31) D
32) G
33) C
34) G
35) A
36) H
37) D
38) G
39) D
40) F
41) B
42) J
43) A
44) F
45) B
46) J
47) A
48) J
49) D
50) F
51) C
52) H
53) D
54) F
55) B
56) G
57) B
58) F
59) C
60) J
61) B
62) G
63) A
64) F
65) B
66) H
67) C
68) H
69) D
70) J
71) A
72) J
73) C
74) J
75) A

Math

1) B
2) H
3) C
4) K
5) C
6) F
7) E
8) G
9) D
10) F
11) D
12) H
13) C
14) G
15) D
16) F
17) B
18) J
19) B
20) K
21) D
22) K
23) B
24) K
25) D
26) K
27) C
28) K
29) C
30) H
31) A
32) H
33) B
34) H
35) D
36) K
37) B
38) K
39) B
40) F
41) D
42) J
43) A
44) F
45) B
46) K
47) D
48) G
49) D
50) J
51) C
52) K
53) D
54) F
55) E
56) H
57) B
58) F
59) A
60) F

Reading

1) A
2) G
3) A
4) H
5) D
6) G
7) B
8) H
9) A
10) F
11) B
12) J
13) C
14) J
15) C
16) F
17) B
18) J
19) B
20) F
21) C
22) J
23) B
24) J
25) B
26) G
27) D
28) F
29) C
30) G
31) D
32) F
33) D
34) G
35) A
36) F
37) C
38) H
39) A
40) J

Science

1) D
2) G
3) A
4) J
5) C
6) F
7) D
8) J
9) C
10) J
11) B
12) G
13) B
14) F
15) A
16) J
17) A
18) G
19) C
20) F
21) A
22) H
23) D
24) F
25) B
26) G
27) D
28) H
29) D
30) H
31) B
32) F
33) C
34) H
35) B
36) H
37) B
38) H
39) D
40) J

Explanation of Procedures Used to Obtain Scale Scores from Raw Scores

On each of the four tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any responses is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it off to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

ACT Test 68G	Your Scale Score
English	_____
Mathematics	_____
Reading	_____
Science	_____
Sum of scores	_____
Composite score (sum ÷ 4)	_____

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score.

Scale Score	Raw Scores				Scale Score
	Test 1 English	Test 2 Mathematics	Test 3 Reading	Test 4 Science	
36	75	60	40	40	36
35	74	59	39	39	35
34	73	57-58	38	—	34
33	72	56	37	38	33
32	71	55	36	37	32
31	70	54	35	—	31
30	69	53	34	36	30
29	68	52	33	35	29
28	66-67	50-51	32	33-34	28
27	65	47-49	31	32	27
26	63-64	45-46	30	31	26
25	61-62	42-44	29	29-30	25
24	58-60	40-41	28	27-28	24
23	56-57	37-39	27	25-26	23
22	53-55	35-36	25-26	23-24	22
21	50-52	33-34	24	21-22	21
20	47-49	31-32	23	19-20	20
19	45-46	29-30	21-22	17-18	19
18	43-44	26-28	20	16	18
17	40-42	22-25	19	14-15	17
16	38-39	17-21	17-18	13	16
15	35-37	13-16	16	12	15
14	32-34	10-12	14-15	11	14
13	30-31	8-9	13	10	13
12	28-29	6-7	11-12	9	12
11	25-27	5	9-10	8	11
10	22-24	4	8	6-7	10
9	19-21	—	7	5	9
8	16-18	3	6	4	8
7	13-15	—	5	—	7
6	10-12	2	4	3	6
5	8-9	—	—	2	5
4	6-7	1	3	—	4
3	4-5	—	2	1	3
2	3	—	1	—	2
1	0-2	0	0	0	1